

PORTLAND FIRE WEATHER – 2010 ANNUAL REPORT

2010 FIRE SEASON OVERVIEW

The 2010 fire season for Northwest Oregon and Southwest Washington was fairly quiet, even more benign than 2009. El Nino conditions persisted through the 2010 winter, and into the first part of spring. This resulted in below normal precipitation and well-below normal snow pack for the Cascades. The El Nino phase quickly transitioned to La Nina by early summer. However, in the interim, persistent troughiness over the Pacific Northwest in May and June resulted in well-above normal precipitation. There was concern that due to the abnormally wet late-spring conditions, increased grass and brush fuel loadings would pose a heightened fire concern once those fuels cured. La Nina became more prominent during the summer, resulting in several periods of onshore flow and minimizing the number of hot spells. Typically, fuel conditions approach or exceed critical levels by late July. In the past few years there has been an August wetting-rain event that temporarily reduces the overall fire danger. The season seems to reach a secondary critical period in September. The most critical part of the fire season lasted about seven weeks, from late-July through the end of August. Fuel conditions reached critical values around July 21st. The most extreme fuel conditions occurred in the second and third weeks of August. Unlike 2008 and 2009, there was not a late-season secondary critical period. The first half of September was much wetter than normal, generally putting an end to the season. The district had two significant fires, both starting in mid-August following a lightning event. The Scott Mountain Fire occurred in the McKenzie Ranger District of the Willamette National Forest. The other major fire was the View Lake Complex, which burned in portions of the Mt. Hood and Willamette National Forests, including Wilderness areas.

Two Red Flag events occurred during the season, which is close to the yearly average. Both events took place in August. The first Red Flag event was a lightning episode in the Cascades August 17th. The other event, August 24-25, was a combination of wind/low humidity and dry/unstable conditions associated with a thermal trough. A total of 9 warnings were issued, less than the 17 of 2009 and 28 in 2008, and the fewest since 2006. There was one incorrect warning and no missed events.

The pre-season precipitation ended up close to average in most locations. The coastal areas had slightly above-normal pre-season precipitation, while the Cascades and foothills were slightly below normal. El Nino conditions prevailed from November through February, resulting in well-below precipitation inland, especially the Cascades and foothills. For example, the December precipitation average for Government Camp is 14.38 inches. In December 2009 Government Camp picked up 7.80 inches. El Nino transitioned to La Nina during the late spring and summer. May and June were extremely wet. The Portland airport received 4.75 inches in May, over 200 percent of normal. Cascade snowfall was rather abysmal, especially during the prime winter months. The Government Camp snow depth hovered around two feet in December and early January, but declined to just a few inches by January 20th. February was no better, with snow depth falling to zero on the 19th. Snow depth remained less than a foot through March. Conditions improved in April, with the maximum seasonal snow depth occurring on the 9th. The 42-inch maximum was well below the 92-inch peak recorded in 2009. The ground was essentially bare on May 10th, which was fairly similar to last year.

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Wet may conditions continued through much of June, which can be seen in the average ERC values. The 10-day average ERC values for the entire forecast area remained near or below 10 through June 30th. Seasonal summertime conditions commenced in early July and continued through August. There was a brief hot spell during the first week of July, and a longer-lasting hot period in mid-August. None of the 2010 hot spells rivaled the record-setting event of 2009. Average ERC values reached seasonal norms around mid-July, a couple weeks later than usual. The most critical fuel conditions for the Cascades occurred in the second and third weeks of August, with average daily ERC values above 50. The highest daily average for zones 606 and 608 was 58 on August 25th. Emigrant RAWs, at the south end of zone 608, reached a maximum ERC of 77 on August 25th. Emigrant exceeded 70 on 7 days, compared to 15 days last year. Unlike 2009, critical fuel conditions abated in early September due to a series of wetting rain events. The 10-day average ERC in zones 606 and 608 was 47 on August 31st, but fell to 24 by September 10th. The seasonal dry spell varied from 45 days in the Central Oregon Cascades and foothills to 80 days in the Coast Range zones.

The late summer and the early part of fall were cool and wet. There were several wetting rain days in the first half of September. The North Oregon and South Washington Cascades and foothills had seven wetting rain days in the first three weeks of September. Six of those days occurred from September 11th through the 20th. Average ERC values across the forecast area fell below 20 by September 20th. Last year the most critical part of the fire season occurred in mid to late September. By the end of September ERC values had fallen below 10 across much of the area. The only exception was zones 606 and 608, where the 10-day average was 13.

There were two critical fire weather events in 2010. One event was for problematic lightning, another was for wind and low humidity combined with dry and unstable conditions associated with a thermal trough. Both events occurred in August.

Most of the district experienced well below-normal lightning activity in 2010. This was especially true for zones 605, 607, and 660. The South Washington and North Oregon Cascades and foothills usually experiences about 13 lightning days during the period May through September. In 2010 there were six lightning days, about 45 percent of normal, and most of those occurred in May and early June. Lightning days were more frequent in the Central Oregon Cascades and foothills, but still slightly below normal. Much more lightning made it into zone 608 in July and August, compared to zone 607. The overall large-scale weather pattern was a primary reason for the seemingly lack of lightning in the Mt. Hood and Gifford Pinchot National Forests. Moist and unstable south flow aloft spread would reach the Willamette National Forest. Persistent southwest to west flow prevailed over the north half of the district, severely limiting the lightning threat. The Coastal strip zones were nearly devoid of lightning, with just two lightning days.

Red-Flag criteria remained unchanged for the 2010 season. The concept of problematic lightning devised by the Northwest Coordination Center continued to be used. Its main premise was to develop Red-Flag criteria highly dependent on current and forecast fuel conditions before, during, and after a significant weather event. The idea was to move away from the subjectivity inherent in the dry lightning concept, or the idea of using specific rainfall criteria. The new criteria provide a better means of verification. Considerable attention continues to be directed at

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Haines 6 patterns, specifically, surface thermal trough passages. The primary focus has shifted to the mid-level Haines, instead of the high-level Haines. In the past several years, surface thermal trough passages have been responsible for extreme fire behavior resulting in significant fire growth on existing fires. Dry and unstable conditions brought the Gnarl Ridge Fire of 2008 back to life in mid-September, after about four weeks of inactivity. The Cold Springs fire in 2008 exhibited significant nocturnal fire growth due to the presence of a surface thermal trough and associated subsidence inversions. This was also the case for the Tumblebug Complex in September of 2009.

A major fire is defined as an incident that is at least 100 acres or requires at least a Type II management team. The forecast district experienced two large fires in 2010, which is about average for any given year. In 2008 there were four large fires, and in 2007 there was one large fire. Both 2010 large fires required a Type I Incident Management organization.

It was a relatively quiet year for the Portland Incident Meteorologists (IMETS). The IMETS provided service on two large fires, a search and rescue mission in December 2009, and support for the Deepwater Horizon oil disaster in the Gulf of Mexico.

Spot forecast activity was about the same as 2009. There were 120 spot forecast requests in 2010, compared to 115 in 2009. There were 51 wildfire spot requests this year versus 58 last year. Prescribed spot requests in 2010 were up from 2009. The forecast office received 62 prescribed burn spot requests, compared to 52 last year. One of the main contributors to the prescribed burn total was the US Fish and Wildlife Service with 26 spots. Only the USFS, with 27 spots, had more prescribed burn requests. The Willamette NF continues to be the primary participant for spot requests. There were 38 spot requests from the Willamette NF, well down from the 67 in 2009. The Washington Department of Natural Resources (DNR) had 17 requests, 16 of which were for wildfire activity. The Hilltop Fire, near Larch Mountain, burned a little less than 100 acres. It did not reach Type II Management status, but resulted in numerous spot forecast requests. City and county emergency management have become more involved in the spot forecast process.

August and September were busy months for spot forecasts, with a total of 63, or slightly more than 50 percent of the seasonal total. Favorable October burning conditions resulted in 18 prescribed burn requests. There were even three spot requests in early November 2010.

Training and outreach remain a significant part of the fire weather program at the Portland office. The staff taught numerous classes, conducted office tours, and gave several presentations to a wide range of users. Outreach activities began as early as mid-December 2009 and continued through June 2010. The Portland office continues to provide assistance to some of its former east-side users as well, primarily Central Oregon Community College.

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FIGURE 1 – PORTLAND FIRE WEATHER DISTRICT

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2010 PRE-SEASON: PRECIPITATION

Table one (page 7) shows precipitation amounts for various locations from fall through spring. Winter 2009-2010 was a classic El Nino event. Note the wet November, followed by generally below-normal precipitation from December through March. El Nino started to fade in the spring, and the end result was an abnormally wet April and May. In fact, the wet pattern continued through much of June. Overall, the coast ended up with slightly above normal precipitation for the period November through May. January was abnormally wet, especially along the Central Coast. Newport received 16 inches during January, which is almost 6 inches above normal. The Precipitation in the Willamette Valley continued a below-normal trend from November through March, although in some areas January and March were close to normal. May was extremely wet, with Portland receiving over twice the normal precipitation. Figure 2 shows the May 2010 precipitation anomaly. The two-month percentage-of-normal precipitation for the period May through June was well above 100% throughout the forecast area. Areas in the Cascades, North Willamette Valley, and North Oregon Coast Range were closer to 200% of normal.

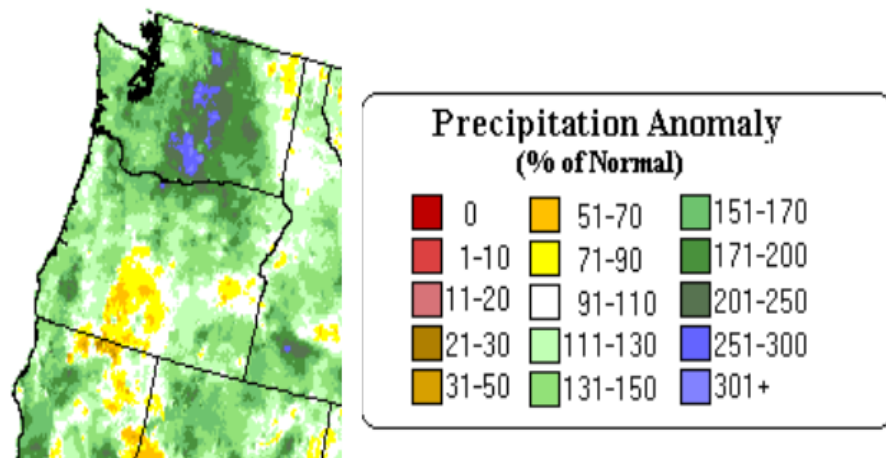


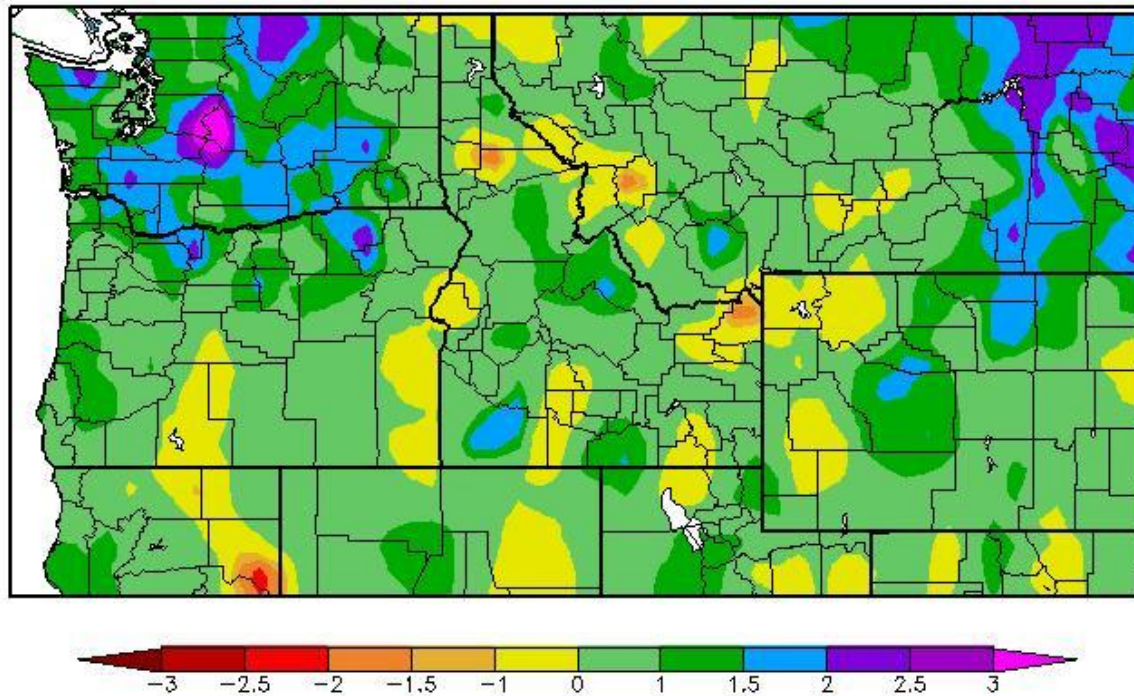
FIGURE 1 - MAY 2010 PRECIPITATION ANOMALY

Figure 2 – May 2010 Precipitation Anomaly

Figure 3 (see next page) shows the Standardized Precipitation Index (SPI) for May 2010. The SPI indicates the number of standard deviations away from the mean average. Much of Southwest Washington and extreme Northwest Oregon exhibited 1.5 to 2.0 standard deviations above normal, with localized 2.5 amounts.

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Monthly SPI
5/1/2010 – 5/31/2010



Generated 6/11/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Figure 3 – May 2010 Standardized Precipitation Index (SPI)

Winter 2010 was a dismal snow season for the Cascades, as evidenced by the Government Camp snow depth graphic on page 13. Snow started to accumulate in the Cascades in early November and continued through Thanksgiving. By November 22nd Government Camp measured 41 inches on the ground. This would be the highest snow depth until April. Despite well below-normal precipitation in December, the snow depth hovered around two feet. El Nino was in full swing January through March, with well below-normal Cascade snowfall. The Government Camp snow depth dwindled to a mere three inches on January 19th. February and March were just as dismal, with snow depth generally below 10 inches, and, at times, down to zero. The diminished Cascade snowpack created some concern from a fire standpoint. It stood to reason that higher-elevation fuels would dry out faster, leading to an earlier start to the fire season.

The wet spring, especially May and June, severely curtailed spring burning projects. The Portland Office received just six spot forecast requests from May 1st to June 14th. The abundant rainfall raised concerns about increased grass and brush fuel loadings that could become problematic after curing. Frequent onshore flow events prevented long periods of critical fuel

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indices. According to data from the Northwest Coordination Center, critical fuel conditions were rare over the majority of the forecast area. Daily average ERC and hundred-hour fuel moistures reached critical levels only a few times from July through September.

There were far fewer lightning days in 2010 compared to 2009, with the majority occurring in May and early June. There was only one Red Flag event for abundant lightning, in mid-August, and just two Red Flag events for the season. Overall, fire season 2010 had potential to be active, in part due to the extremely wet spring and lack of Cascade snowpack, but mitigating factors such as frequent onshore flow patterns, timely wetting rain events, and limited lightning activity helped reduce the seasonal severity. The fact that the forecast area had just two large fires seemed to support the conclusion that the 2010 fire season was benign.

TABLE 1 - 2009-2010 WET SEASON PRECIPITATION SUMMARY

	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOT	AVE	PCT AVE
Astoria	16.71	5.76	11.19	7.41	7.15	7.67	4.30	60.19	53.71	112.06%
Newport	10.75	5.70	16.00	7.47	8.63	8.06	4.58	61.19	57.47	106.47%
Fall Creek	13.31	12.21	11.28	9.33	13.97	11.28	5.72	77.10	78.34	98.42%
Portland	5.13	3.76	4.94	2.80	3.58	2.92	4.75	27.88	28.98	96.20%
Eugene	5.63	5.15	5.13	4.58	5.43	4.01	3.72	33.65	42.35	79.46%
G. Camp	10.31	7.80	11.07	5.02	9.56	8.83	10.01	62.60	71.40	87.68%
Oakridge	5.80	3.46	5.21	3.18	4.56	5.71	4.22	32.14	37.34	86.07%

FAST FACTS: JUNE PRECIPITATION

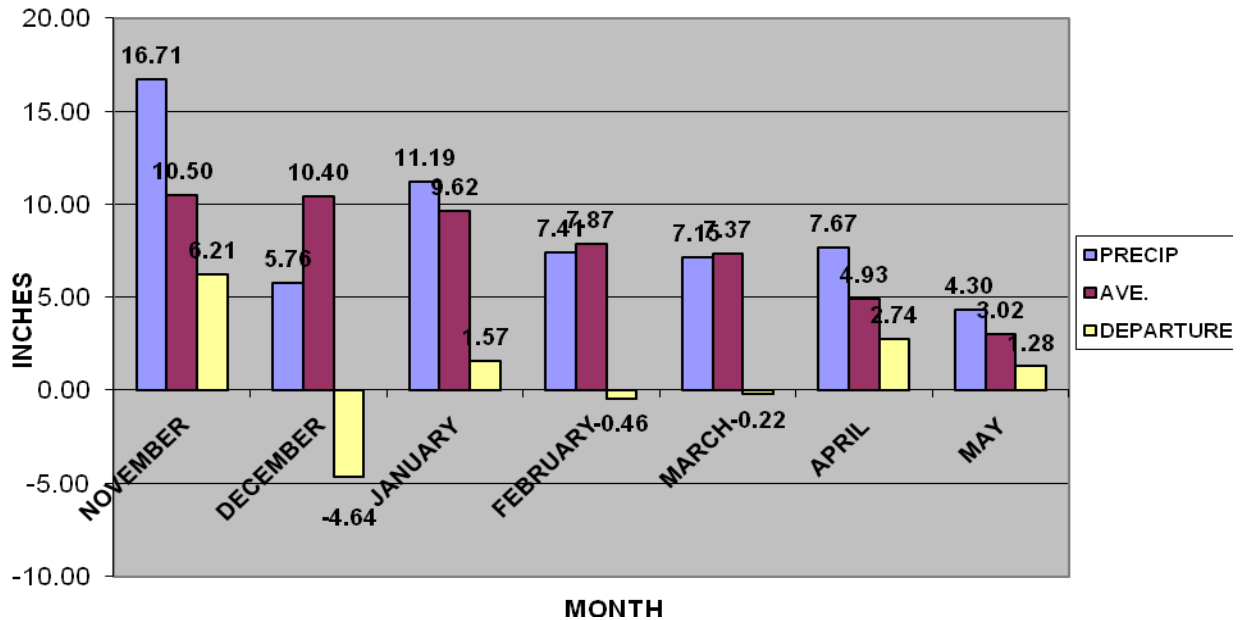
June 2010 was an extremely wet month, as evidenced by the monthly totals below:

<i>Portland Airport</i>	<i>4.27 inches</i>	<i>normal 1.59 inches</i>
<i>Detroit Dam</i>	<i>9.09 inches</i>	<i>normal 3.51 inches</i>
<i>Government Camp</i>	<i>7.80 inches</i>	<i>normal 3.80 inches</i>

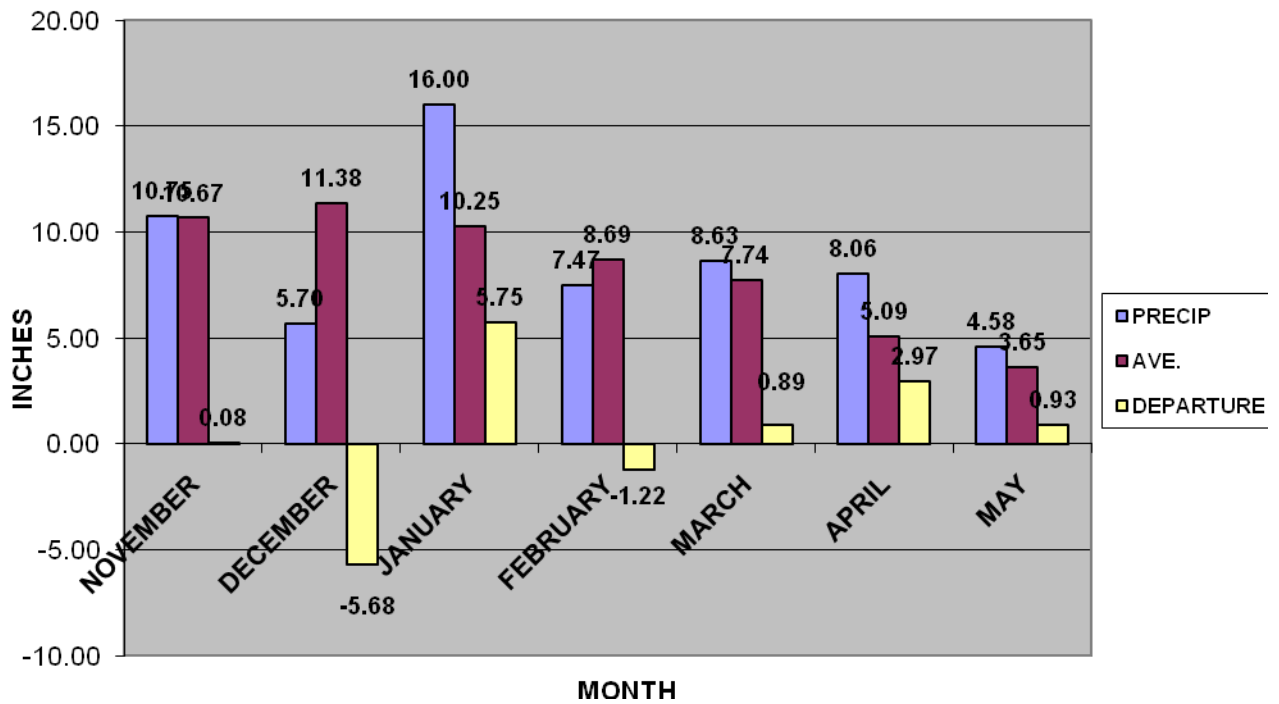
The Portland Airport received 9.02 inches from May 1st through June 30th. This was more than December and January combined. On June 3rd Detroit Dam picked up 2.45 inches. The McKenzie Bridge Ranger Office had 2.20 inches on June 2nd, and then another 1.39 inches on the 4th. Lyons, east of Salem in fire zone 605, had three consecutive days of an inch or more of precipitation June 2nd through the 4th. The 3-day total was 3.56 inches.

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2009-2010 WET SEASON ASTORIA

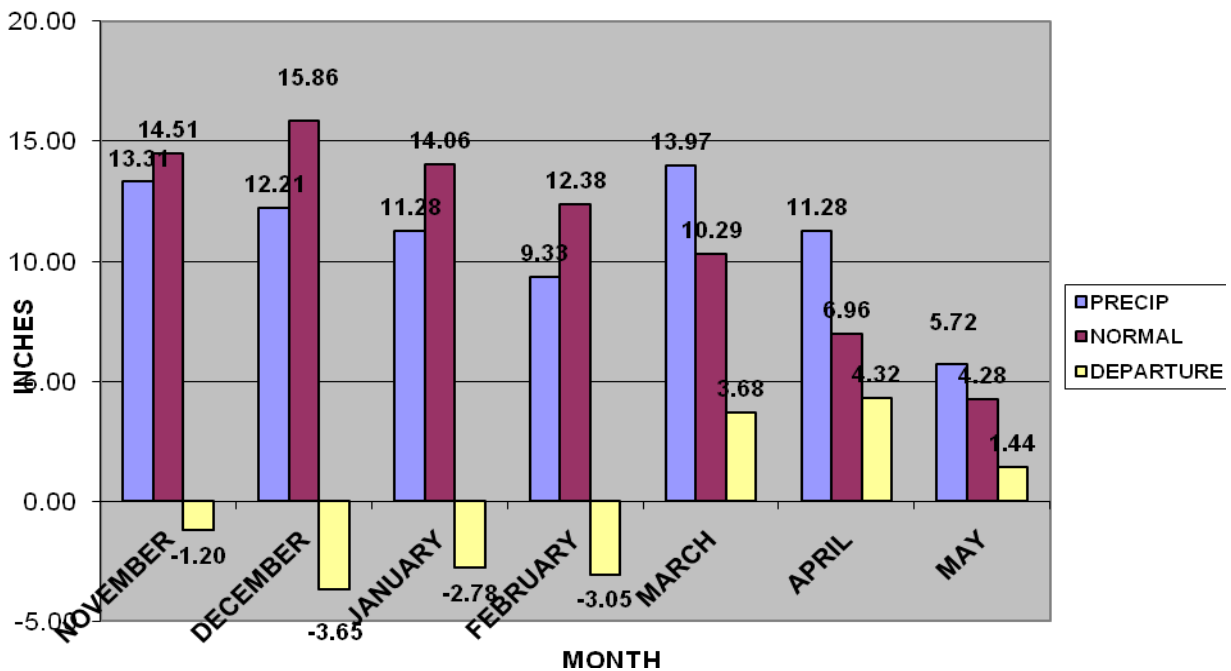


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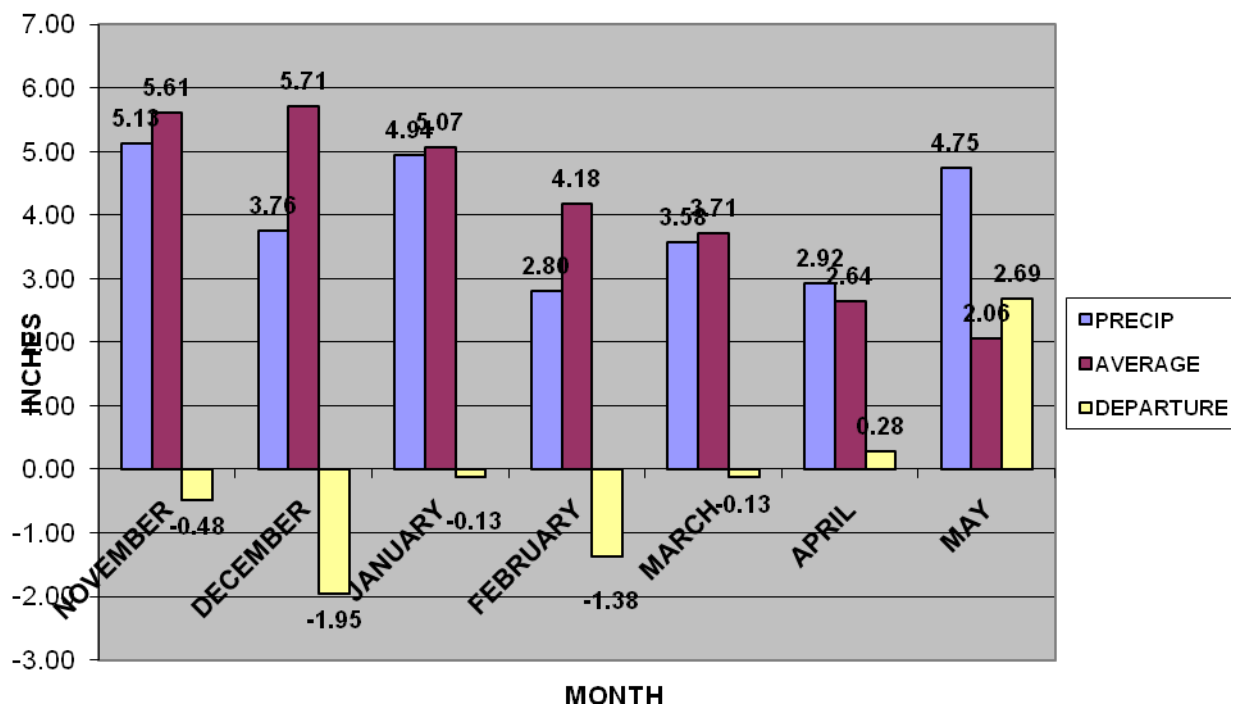


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2009-2010 WET SEASON ALSEA-FALL CREEK

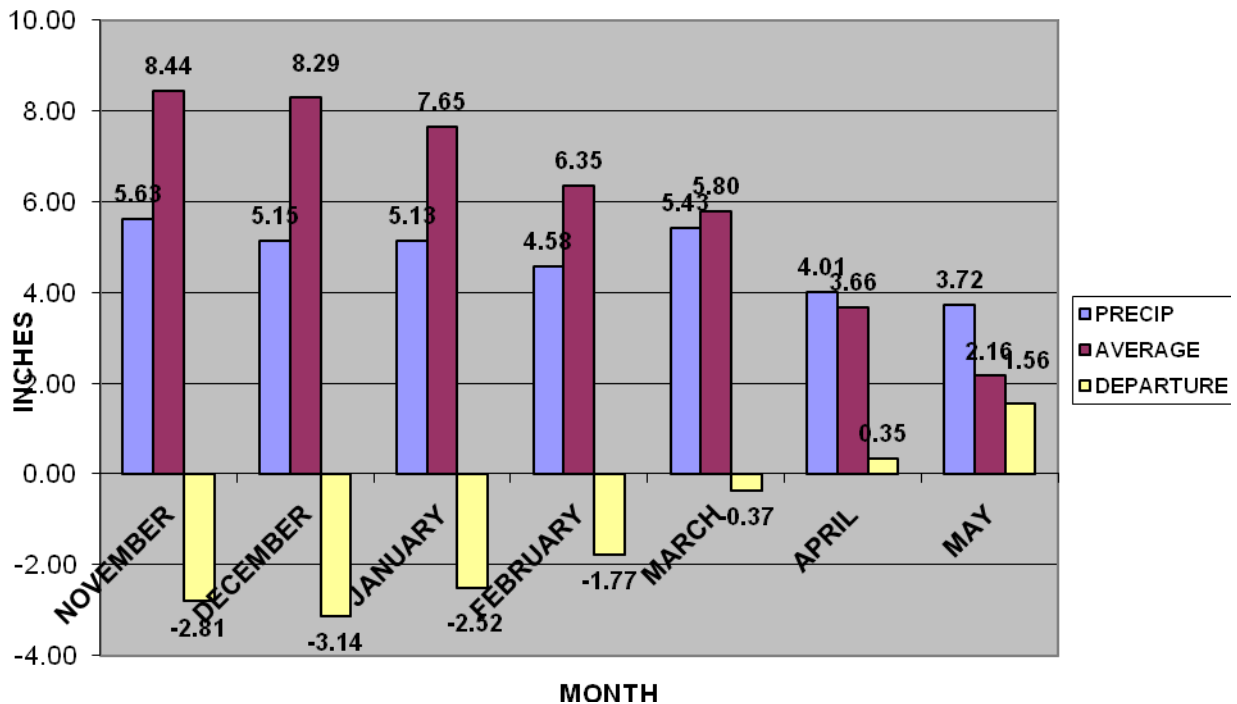


2009-2010 WET SEASON PORTLAND

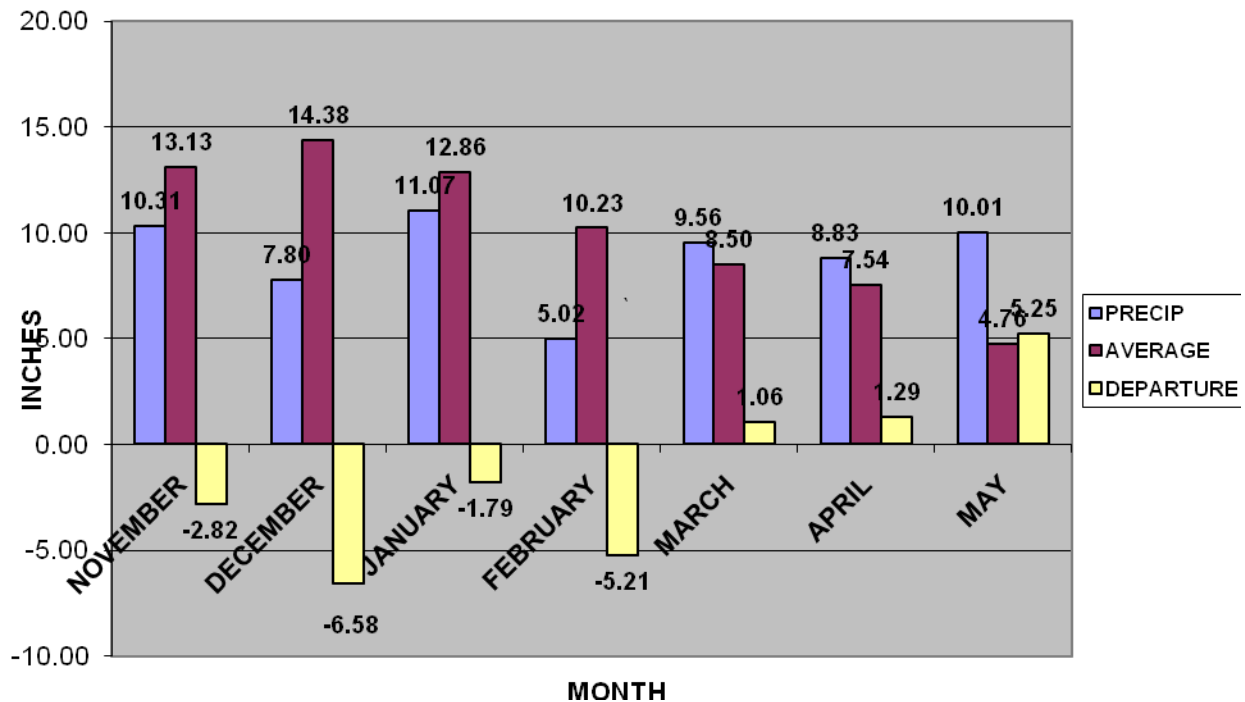


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2009-2010 WET SEASON EUGENE

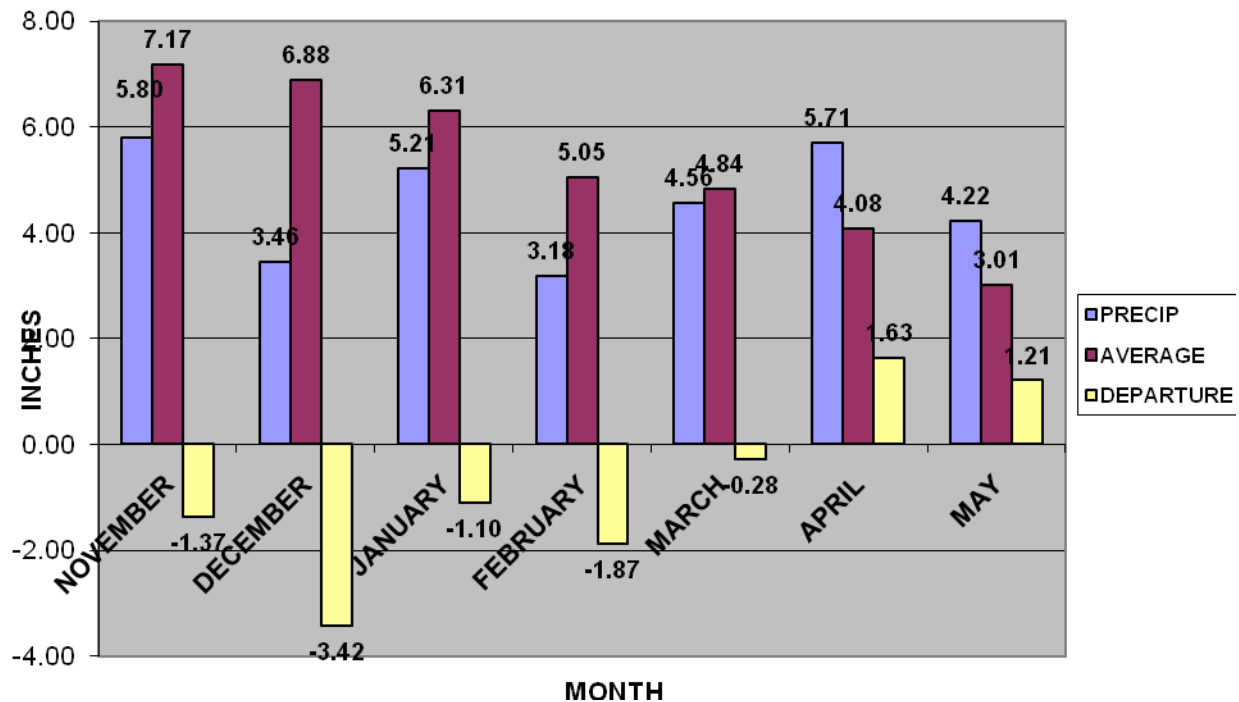


2009-2010 WET SEASON GOVERNMENT CAMP



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2009-2010 WET SEASON OAKRIDGE



2010 FAST FACTS: On August 17th a major lightning outbreak resulted in over 4000 strikes across Oregon, with the majority in the Cascades. The lightning event occurred at the tail end of the most significant hot spell during 2010, and resulted in numerous fire starts. The Scott Mountain fire was detected around 330 AM on August 19th. The fire slowly grew to 985 acres by August 25th, but increased to over 2500 acres on the 26th. The final official size was 3464 acres. The fire resulted in closure of highway 242, the McKenzie Pass highway, portions of the Mt. Washington Wilderness, and a section of the Pacific Crest Trail.

The August 17th lightning event also resulted in the View Lake Complex. This was a cluster of fires in the Olallie Scenic Lake Area, Mt. Jefferson Wilderness, and Bull of the Woods Wilderness of the Willamette and Mt. Hood National Forests. The fires covered 4775 acres, the largest of which were the Pyramid Lake and Bull of the Woods fires. Total suppression cost, as of September 7th, was close to \$9 million.

The last lightning day of the 2010 fire season was September 17th. Thunderstorms occurred all along the Cascades, with additional lightning concentrations in North-Central Oregon and the Blue and Wallowa Mountains of Northeast Oregon. There were no lightning strikes in the Gifford Pinchot National Forest.

Hot and dry conditions on August 14th resulted in rapid growth of the Hilltop Fire. The incident started on Department of Natural Resources (DNR) land near Larch Mountain, in fire zone 660.

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2009-2010 GOVERNMENT CAMP SNOW DEPTH DATA

The 2009-2010 Government Camp snow-depth data (Figure 4) is shown on page 13. The chart also includes data from 2008-2009 and the average snow depth. Similar to last year, the 2009-2010 snowfall came in two phases. The first round occurred in mid to late November. On November 14th there were 23 inches on the ground. Snow depth remained 15 to 20 inches through the 20th, and then jumped to 41 inches on the 22nd. This would be the highest amount until early April. Classic El Nino conditions resulted in abysmal winter snowfall in the Cascades. Christmas Day snow depth was a mere 20 inches, and then fell below 10 inches by January 11th. The highest February snow depth was 10 inches on the 2nd. From February 19th through the 23rd the official snow depth report was zero. The second snow phase began at the end of March and continued through mid-April. The highest snow depth of the season, 42 inches, was noted on the 9th and 10th. Typically, the peak snow depth usually occurs in early to mid March. Snow depth quickly diminished in mid April. By the 15th there was 20 inches on the ground, and by the 25th the official reading was zero. There was a small burst in early May, but it did not last long. Snow depth hit zero on May 10th, a few days earlier than last year.

Snow cover vanishes, on average, by June 10th. In 2005, the snow cover was gone by April 19th, but there was not nearly as much snow to melt compared to 2006. The snow lasted one week longer in 2006 compared to 2005. In 2007, the snow was gone by April 22nd, which is a striking contrast to 2008 when 93 inches was still on ground.

GOVERNMENT CAMP SNOW DEPTH TRIVIA: The average snow depth on Christmas Day is 25 to 30 inches. On Christmas Day 2008 there were 72 inches on the ground, which was the most since 2002. December 2004 was a horrible time for snow, with just 3 inches on the ground Christmas Day.

The largest single-day snow depth increase in 2009-2010 was 11 inches, on multiple occasions. On November 21st, 2009 snow depth went from 19 inches to 30 inches. On the 22nd the snow depth increased to 41 inches. On April 3rd the snow depth jumped from 16 inches to 27 inches.



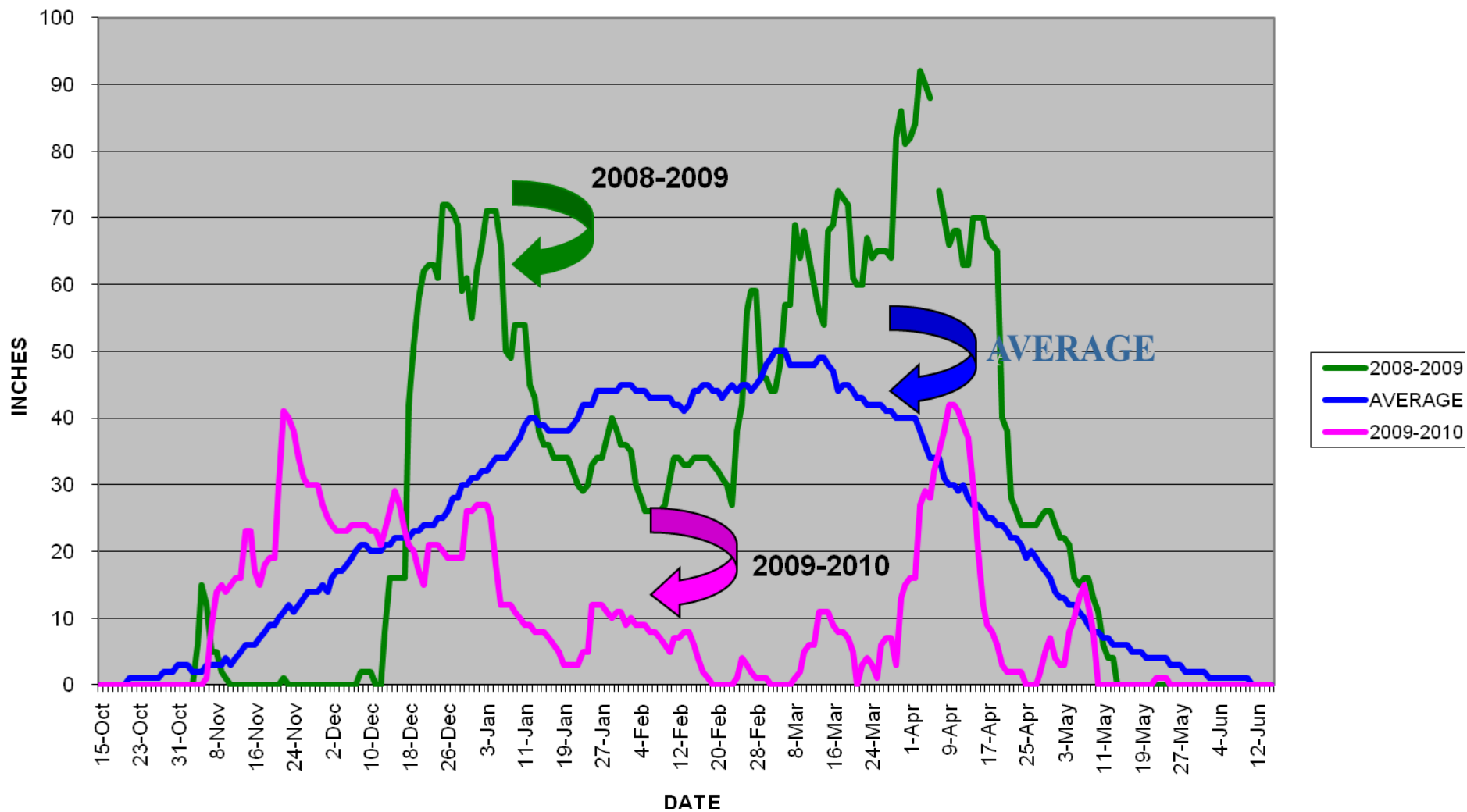
OTHER OREGON LARGE FIRES IN 2010:

Other large 2010 fires in Oregon included:

<i>White Lightning Complex</i>	<i>Warm Springs Agency</i>	<i>33,732 acres</i>
<i>Lower Deschutes Complex</i>	<i>Prineville BLM</i>	<i>9,304 acres</i>
<i>Oak Flat Fire</i>	<i>Rogue River-Siskiyou NF</i>	<i>7,494 acres</i>
<i>Cougar Mountain Fire</i>	<i>Prineville BLM</i>	<i>2,064 acres</i>
<i>Phoenix Wildland Fire</i>	<i>Crater Lake NP</i>	<i>750 acres</i>

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FIGURE 4 - GOVERNMENT CAMP SNOWDEPTH



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2010 FIRE SEASON LIGHTNING DATA

Table two shows the lightning frequency, by area, for the 2010 season.

TABLE TWO: 2010 LIGHTNING DATA (MAY THROUGH OCTOBER)

AREA	# LIGHTNING DAYS 2010	AVE. # DAYS (LAST 15 YEARS)	PERCENT AVE.
ZONES 601/612	2	6.87	29.1%
ZONES 602/603	7	8.20	85.4%
ZONE 604	9	8.71**	103.3%
ZONES 605/607/660	6	12.53	47.9%
ZONES 606/608	15	14.40	104.2%

*** Average over 17-year period.*

TABLE TWO: 2010 LIGHTNING FREQUENCY.
DATA OBTAINED FROM BLM LIGHTNING DETECTION AND NORTHWEST COORDINATION CENTER

Overall, 2010 was a below-normal lightning year for the Portland forecast area. Nearly 60% of the total number of lightning days occurred from May 1st to June 20th. Fire danger was extremely low due to an abnormally wet May and June. Lightning data was collected from May 1st through October 20th. The coastal strip was nearly devoid of lightning activity during the fire season. The total of two lightning days in zones 601 and 612 was the lowest in at least 15 years. The previous low was 3 days in 2002. Another interesting observation is the lightning disparity for the Cascade zones. The South Washington and North Oregon Cascades and foothills had 6 lightning days, while the Central Oregon Cascades and foothills had 15 days. Normally, the difference is not that large, as can be seen in the above table. From July 1st to September 20th zones 606 and 608 had eight lightning days, but zones 605, 607, and 660 had two. There were several occasions when lightning developed in the South Oregon Cascades and then moved north along the Cascade Crest into zone 608. By the time the thunderstorms exited the north end of zone 608, there seemed to be enough west component to push them onto the east Cascade slopes, missing zone 607.

The most prominent lightning event occurred August 17th. This was one of the two Red Flag Events for the district. A Red Flag Warning was issued at 1225 PDT August 16th for zones 607, 608, and 660. Oddly enough, the lightning did not make it to zone 660. Data obtained from the BLM lightning web page showed over 4200 total strikes in Oregon and Washington from 0500 on the 17th through 0500 on the 18th. There were numerous fire starts in zones 607 and 608 during this episode, a few of which became

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large fires. The View Lake Complex and the Scott Mountain Fire were the most notable. Lightning activity diminished substantially after the August 17th event. Zones 605, 607 and 660 had one lightning day after August 20th, while zones 606 and 608 had two days.

Climatologically, the first major lightning episode occurs around July 21st. Normally, one or two critical fire weather patterns or events occur during the fire season that likely result in problematic lightning. Such events include the breakdown of an upper ridge, Haines 6 conditions, or lightning after an extended dry period. These isolated events cause the majority of large fires. The Portland Forecast Office issued Red Flag Warnings for two events during the 2010 season. One was for lightning (see above), and the other for a combination of wind, low humidity and mid-level Haines 6 conditions. The most critical fuel conditions during the past couple of seasons have occurred in early to mid-September. This year the most critical fuel conditions occurred in mid to late August.

The lightning criteria for the Portland forecast area were modified four seasons ago in an attempt to better represent the true problem patterns. Dry lightning is hard to forecast and harder still to verify. The Northwest Coordination Center developed a more objective analysis for problem lightning. The general premise is to combine lightning potential with observed and forecast fuel conditions. A Red Flag Warning is warranted when lightning is expected **AND** fuel conditions are forecast to remain moderate or critical during and after the weather event. Also, lightning activity must be scattered, or greater, in coverage.



Figure 5 – Scott Mtn. Fire August 25, 2010. Photo courtesy of James Rudisill

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RED FLAG WARNING STATISTICS FOR 2010

Table three shows the Red Flag verification statistics for the 2010 fire season.

TABLE THREE (ALL WARNINGS)

ZONE	# RFW	CORRECT RFW (A)	INCORRECT RFW (B)	MISSED EVENTS (C)	POD A/(A+C)	CSI A/(A+B+C)	FAR (1- [A/(A+B)])
601	0	0	0	0	0.00	0.00	0.00
612	0	0	0	0	0.00	0.00	0.00
602	0	0	0	0	0.00	0.00	0.00
603	0	0	0	0	0.00	0.00	0.00
604	1	1	0	0	1.00	1.00	0.00
605	1	1	0	0	1.00	1.00	0.00
606	1	1	0	0	1.00	1.00	0.00
607	2	2	0	0	1.00	1.00	0.00
608	2	2	0	0	1.00	1.00	0.00
660	2	1	1	0	1.00	0.50	0.50
TOTALS (ALL)	9	8	1	0	1.000	0.889	0.111
LIGHTNING	3	2	0	0	1.000	0.667	0.333
WIND/RH	4	4	0	0	1.000	1.000	0.000
HAINES 6	2	2	0	0	1.000	1.000	0.000

NUMBER OF WARNED EVENTS: 2
EVENTS PRECEDED BY A WATCH: 0 OR 0%
MISSED EVENTS: 0

NOTE: Refer to the Annual Operating Plan for complete Red Flag criteria.

WET JUNE: The first half of June was extremely wet, especially the first week. A very wet late-spring weather system dumped substantial rainfall over the district June 2nd. The following are some calendar-day rainfall amounts:

<i>Log Creek RAWS</i>	<i>4.13</i>	<i>Yellowstone RAWS</i>	<i>3.50</i>
<i>Goodwin Peak RAWS</i>	<i>3.03</i>	<i>Pebble RAWS</i>	<i>2.72</i>

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EVENT LEAD TIMES

Tables 4 and 5 show the respective warning and watch lead times for all events in 2010.

TABLE FOUR – WARNING LEAD TIMES

EVENT	RANGE OF LEAD TIMES	AVE. ZONE LEAD TIME
<i>August 17 (Lightning and Haines 6)</i>	15 hrs 5 min ZONE 607 15 hrs 5 min ZONE 608	15 HRS 05 MINS
<i>August 24-25 (Wind/Low RH and Haines 6)</i>	0 LEAD TIME ZONE 606 0 LEAD TIME ZONE 607 0 LEAD TIME ZONE 660 5 hrs 39 min ZONE 604 8 hrs 46 min ZONE 608 22 hrs 11 min ZONE 605	6 HRS 06 MINS
OVERALL AVE. LEAD TIME		13 HRS 21 MINS

TABLE FIVE – WATCH LEAD TIMES

EVENT	RANGE OF LEAD TIMES	AVE. ZONE LEAD TIME
<i>August 17 (Lightning and Haines 6)</i>	NO WATCH ISSUED	
<i>August 24-25 (Wind/Low RH and Haines 6)</i>	NO WATCH ISSUED	
OVERALL AVE. LEAD TIME	0 HRS 0 MINS	

SNOW IN AUGUST??: A cold upper trough at the end of August brought significant precipitation to the Cascades, and unseasonably cool daytime temperatures. In fact, personnel on the Scott Mountain Fire reported snow near the 5000-foot level. RAWs reports at 1700 PDT included 48 degrees at Dry Creek (zone 660), 49 at Wanderer's Peak (zone 607), 50 at Boulder Creek (zone 608), and 51 at Horse Creek (zone 605).

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A few notes on verification and the 2010 events: The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This, in itself, could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical level normally requires an additional weather element, or trigger, to be superimposed on the dryness factor. This additional trigger could be thunderstorms with no appreciable precipitation, an extremely unstable air mass (Haines 6), or a combination of strong wind and low humidity. Red Flag warnings are issued when a combination of critical weather elements exist **WITH** sufficiently dry fuels and severe burning conditions.

Determining lead-time for problematic or dry lightning is highly subjective. The Portland office has made a major effort to get away from the term *dry lightning*. In 2004, new lightning criteria were introduced to the users. However, the definition of episode lightning was misunderstood. Therefore, in 2005, the phrase *lightning with no appreciable precipitation* was introduced. The general premise was to avoid the subjectivity of determining whether lightning was wet or dry. If the fuel conditions were expected to remain high or critical during and after the lightning event, then a Fire Weather Watch or Red Flag warning was warranted. The Northwest Coordination Center developed a scheme to monitor fuel conditions. The two correlating factors were determined to be Energy Release Component (ERC) and 100-hour fuel moisture. It was found that there were distinct breakpoints of ERC and 100-hour fuel moisture that corresponded to minimal or no large fire potential, an average risk of large fire potential, and a higher than average risk of large fire potential.

It is a given that fires **WILL** occur during or after a lightning episode following an extended dry spell. However, does that fact alone warrant a Red Flag warning? If all the resultant fires remain small and/or initial attack can handle them, was it a critical event? Should one or more resultant lightning fires get big, then it is reasonable to assume the event was critical and a warning justified.

There were no changes in the Red Flag criteria for the 2010 season. As a review, the wind/low RH criteria are based on distinct geographic and climatic zone groupings. The Portland fire weather region is divided into five regions, and Red Flag criteria for wind and low humidity were assigned to each region. It is also assumed that if one fire weather zone within a region reaches criteria, then, by default, the remaining zones within the region achieves criteria. It is hard to imagine a synoptic-scale east wind event, typical of late spring or late summer, that verifies in the North Oregon Cascade foothills, but **DOES NOT** verify in the adjacent North Oregon Cascades or South Washington Cascades. Verification of wind and low humidity continues to be hampered by RAWS issues. The land agencies have put forth more effort at RAWS maintenance during the past couple of years, but more work needs to be accomplished. Some RAWS sites that were good wind stations in the past, have suffered due to overstory growth, understory expansion, and other environmental factors.

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Another verification problem arises when verifying warnings by zone. Multiple zones may be included in a warning, but some areas may not have good verifying observing stations. Some zones end up not meeting warning criteria simply because there are no good verification stations. This, in turn, will result in lower Probability of Detection (POD) scores, and higher False Alarm Rates (FAR). Moving RAWS stations may actually hinder verification. There has been a push in the past couple of years for units or districts to conduct seasonal surveys on their RAWS stations and take appropriate action to clear brush, remove trees, etc in order to conform to RAWS site standards.

NFDRS VERIFICATION STATISTICS FOR 2010

National Fire Danger Rating System (NFDRS) forecasts remain a high priority at the Portland office. Users depend on these forecasts for a variety of reasons, such as determining whether to limit or curtail forest activities, updating pocketcards, and determining staffing levels. A Memorandum of Understanding (MOU) between the Pacific Northwest Coordinating Group (PNWCG) and National Weather Service used to exist, that specified expected forecast performance measures for NFDRS forecasts. These verification standards were based on performance against persistence. The base performance measures were 35 percent improvement over persistence for temperature, 25 percent improvement for humidity, and 10 percent for wind. However, the MOU also called for a goal of 30 percent improvement each year. Over time, this 30 percent annual improvement became unreasonable. The MOU no longer exists. As of 2008, user expectations were simply to show some degree of improvement over time.

The Portland office switched to all-points NFDRS forecast in 2009, instead of zone trend forecasts. It was shown by neighboring forecast offices that individual point forecasts yielded higher verification scores versus zone trend forecasts. In the past, the Portland office provided individual NFDRS forecasts for eight sites: Village Creek, Pebble, Fields, South Fork, Wanderer's Peak, Horse Creek, Yellowstone, and Canyon Creek. Table six (next page) shows the 2010 NFDRS verification stations for the above listed sites. Wind forecasts for Wanderer's Peak were not provided due to an inoperative wind sensor. The values in red indicate improvement over the 2009 scores.



Figure 6 – The Hilltop Fire near Larch Mountain, WA

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TABLE SIX – 2010 SITE-SPECIFIC NFDRS VERIFICATION

SITE	TEMPERATURE			HUMIDITY			WIND		
	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE
<i>Village Creek</i>	4.08	6.62	38.37%	9.18	12.55	26.85%	1.07	1.28	16.41%
<i>Pebble</i>	3.11	6.04	48.51%	8.91	14.41	38.17%	1.83	1.80	-1.67%
<i>Fields</i>	3.54	6.27	43.54%	10.73	14.86	27.79%	2.47	2.50	1.20%
<i>South Fork</i>	3.46	6.10	43.28%	9.75	14.72	33.76%	1.42	1.64	13.41%
<i>Wanderer's Peak</i>	4.05	6.44	37.11%	10.50	14.03	25.16%	1.66	1.50	-10.67%
<i>Horse Creek</i>	3.46	5.76	39.93%	10.36	13.18	21.40%	1.24	1.29	3.88%
<i>Yellowstone</i>	3.65	6.94	47.41%	8.86	13.29	33.33%	1.23	1.35	8.89%
<i>Canyon Creek</i>	5.79	9.13	36.58%	12.43	18.54	32.96%	1.70	1.75	2.86%

MORE 2010 NFDRS VERIFICATION TIDBITS:

The 2010 fire season posed some NFDRS-forecasting difficulties. There were frequent bouts of onshore flow throughout the summer, which resulted in a marine layer. Some of the marine surges were stronger than others, creating a deeper and more persistent marine layer. The marine layer creates havoc for the NFDRS forecaster. If the marine clouds dissipate a little sooner or later than expected, NFDRS verification scores can suffer. The humidity scores in table six are a prime example. The overall improvement over persistence in 2010 was lower at all stations compared to 2009. In some cases, the forecaster mean absolute error (MAE) was better than last year, but the persistence MAE was even lower.

Forecasters exhibited improvement in temperature at some locations. The forecaster MAE was a little lower at most of the eight sites, but the persistence MAE showed even better improvement. The frequency of onshore flow days and fewer big-change days are a couple of factors to consider. The biggest improvement was in the wind category. Five of the eight stations had better wind scores, and six station scores were positive. Stations such as Village Creek, Horse Creek, and Yellowstone typically reported 10-minute wind speeds of 4 mph or less at NFDRS time. It is difficult to beat persistence when the average NFDRS wind speed is 1 to 2 mph. The Wanderer's Peak wind score appeared to be an anomaly. The station often reported zero wind speed during the first part of the season. However, forecasters either were not aware of this, or failed to edit the computer-generated NFDRS forecast output.

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The following table (Table 7) shows the 2010 NFDRS verification statistics, by area, and by zone. Improvement in temperature and RH are shown in blue. Improvement in wind is shown in blue, positive wind score but no improvement from 2009 is in purple, and red wind scores indicate lower scores compared to 2009.

TABLE SEVEN – 2010 NFDRS VERIFICATION

ZONE	TEMPERATURE	HUMIDITY	WIND
601	39.3%	29.8%	6.1%
602	38.4%	29.8%	8.3%
603	30.0%	20.3%	3.0%
604	40.2%	27.2%	14.0%
605	32.0%	16.5%	12.5%
606	42.2%	24.0%	1.4%
607	39.3%	34.0%	-3.5%
608	44.8%	33.7%	-2.6%
612	27.2%	18.3%	9.7%
660	41.0%	32.9%	11.8%
ALL	38.5%	28.1%	5.5%
2009 ALL	40.5%	33.7%	4.0%
2008 ALL	33.0%	28.2%	1.2%

The overall 2010 temperature and humidity scores were lower than 2009. The 2009 forecaster temperature MAE was 4.30 degrees. This year it was 4.03. There were fewer big-change days in 2010, resulting in a persistence temperature MAE of 6.55, or almost a full degree lower than last year. The frequent onshore pattern yielded lower NFDRS humidity scores. This was readily apparent in zone 612, the central coastal strip. Last year the zone 612 humidity score was 29.6 percent. In 2010 it was 18.3 percent. Dunes and Goodwin Peak RAWS were difficult forecast points. Both had overall humidity scores of 16 percent or less.

The wind scores continued to show annual improvement, albeit small gains. Six of the 10 fire zones had better wind scores this year. In zone 608, the most troublesome wind station was Boulder Creek, with a score of -15.6 percent. Of all the RAWS sites in zone 608, it has the lowest variability in wind speed. Typically, Boulder Creek reports a 1 to 3 mph wind speed at observation time. The persistence MAE was only 1.22 mph.

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Wind continues to be a difficult element to forecast due to limited variability, but there has been improvement at many stations over the past couple of years. There were many stations with a 10 percent or greater improvement over persistence. In general, those stations with a persistence wind MAE of 2.5 or greater showed the best forecaster improvement. Forecasters did quite well at stations such as Abernathy Mountain, Larch Mountain, Willow Creek, Dunes, and Three-Corner Rock. Under seasonal conditions, forecasters typically forecast a 24-hour wind speed trend of zero, one, or two mph. However, there are times when forecasters can make significant wind-score points at sites such as Three-Corner Rock, Larch Mountain, and Abernathy Mountain. These are prominent east-wind locations. Big points can be made if there is a major change or reversal in the low-level gradient.

Big-change days are crucial to positive NFDRS statistics. These are golden opportunities to make big points over persistence. Marine surges typically offer the forecaster a chance to obtain plenty of points over persistence. Conversely, marine surges can be the most difficult pattern for NFDRS forecasts. The marine layer may be deeper or shallower than expected, which results in large mean absolute errors. Strong onshore flow could persist for multiple days, but the forecaster may believe the pattern will change sooner. This also results in large errors over persistence. The extent, or lack, of a marine layer and its dissipation heavily influences sites along the coast, in the Coast Range and Willapa Hills, Willamette Valley, and the Cascade foothills.

NEW FOR 2011:

The Portland office may be a test site for a revised fire weather forecast format. Individual elements will not be eliminated from the text forecast, but it may become more streamlined. The primary objective is to shorten the text product to make it easier for dispatchers to broadcast.

A new Columbia Gorge fire weather zone may be established.

RAWS CHANGES:

Larch Mountain, Three-Corner Rock, and Elk Rock (zone 660) continue to be functional on a seasonal basis. Washington DNR normally brings those stations back to service in mid to late June, depending on snowpack conditions.

Stayton RAWS (zone 605), owned by ODF, was moved in early July 2010, to the Jordan Fire Station.

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STATISTICS FOR AREA ONE (COASTAL STRIP ZONES)

This area is comprised of zones 601 and 612. RAWs that represent the area include:

Cedar Creek, Cannibal Mountain, Goodwin Peak, Huckleberry, Dunes, and Tillamook.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			3 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	52.1	35.8	61.9	0	97.6	0	0	25.05	6	3	2	0
11- 20	57.0	42.4	63.4	0	96.4	0	1.35	18.88	4	3	2	1
21- 31	54.7	43.2	71.4	0	97.4	0	0.92	25.00	6	4	2	0
June 1-10	56.8	46.0	80.8	0	99.2	0	0	29.25	8	8	6	0
11-20	56.0	42.9	70.6	0	98.1	0	0	20.64	5	0	0	0
21-30	64.8	46.7	63.1	0	97.7	0	3.89	18.13	0	0	0	0
July 1-10	69.5	49.7	55.6	1	91.4	1	11.75	16.06	2	2	1	0
11-20	66.9	47.1	58.5	0	95.8	0	21.84	14.30	0	0	0	0
21-31	68.6	50.2	57.0	0	91.5	0	28.48	14.06	0	0	0	0
Aug 1-10	66.2	50.5	69.4	0	98.0	0	25.20	17.00	0	0	0	0
11-20	72.0	52.0	54.3	0	92.6	0	30.52	15.34	0	0	0	1
21-31	66.8	48.1	57.2	1	93.5	1	32.19	15.13	2	1	1	0
Sept 1-10	64.0	48.2	68.0	0	98.6	0	15.10	20.78	4	2	2	0
11-20	63.9	51.4	77.9	0	99.2	0	10.13	23.60	6	4	4	0
21-30	68.8	52.2	66.5	0	98.8	0	4.03	23.05	3	2	0	0
Oct 1-10	62.1	45.6	67.2	0	97.8	0	7.78	18.61	1	0	0	0
11-20												
AVE/TOT.	64.15	47.64	64.51	2	96.21	2	16.07	18.46	47	29	20	2
2009	65.69	49.39	60.94	2	95.22	6	15.87	16.79	35	21	11	10
2008	64.0	48.5	64.3	0	92.6	21	12.55	17.62	45	26	15	2
2007	63.5	48.0	63.2	3	93.8	18	15.49	16.94	53	29	19	6
2006	66.7	49.3	55.6	8	85.8	41	23.1	15.0	35	21	16	5
2005	64.9	49.0	63.5	2	91.5	27	13.7	18.1	65	36	24	18
2004	66.2	51.0	64.5	2	92.2	13	9.6	18.3	55	36	29	13
2003	66.5	49.9	58.9	5	88.6	22	31.4	13.8	32	19	14	14
2002	65.5	49.4	63.6	5	92.0	23	20.3	15.9	37	20	10	3

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DRY SPELL

2010	2009	2008	2007	2006	2005	2004	2003
58 DAYS	29 DAYS	48 DAYS	29 DAYS	63 DAYS	60 DAYS	53 DAYS	105 DAYS

AREA HIGHLIGHTS

OVERVIEW: The coastal zones were slightly cooler, but wetter, compared to the 2009 season. One of the biggest differences was the number of days the median precipitation was 0.25 inches or greater. Last year there were 11 such days, but in 2010 there were 20 days. May and June were extremely wet, with 60% of the wetting rain days occurring in those months. Another big difference was the lightning frequency. The area had two lightning days, compared to 10 last year. This was the second consecutive year that the number of nights with an average humidity of 60 percent or lower was less than 10. There were just two such nights in 2010, by far the fewest since 2002.

Average ERC values peaked in mid to late August. Last year the peak was in late July. The average ERC value exceeded 30 for two 10-day periods this year. Last year the highest 10-day average was 28.8. The wet May and June resulted in average ERC values of near zero. By June 30th the average ERC value was 3.9, compared to 11.2 at the same time last year. Average ERC values quickly rose in July and August, but dropped to around 10 by mid-September.

The dry spell, defined as median precipitation of less than one-tenth of an inch, was 58 days, which was twice as long as the 2009 dry spell. The dry spell occurred from July 3rd through August 29th. The 2010 dry spell is misleading, as it would seem to indicate a dry year with elevated fuel conditions. Due to the extremely wet June, it took longer for fuels to reach seasonal conditions. Also, the frequency of onshore flow events kept daytime temperatures down with higher humidity.

RAWS NOTES: Data collection ended October 10th.

TEMPERATURE

The seasonal average of 64.2 was 1.5 degrees cooler than 2009.

The warmest 10-day period: August 11-20 (72.0 degrees).

Number of days when the average high was 85 degrees or higher: **2**

Highest daily average high: **86.8 on August 24th.**
84.5 on July 7th.

Highest temperatures: **Tillamook 97 on July 7th.**
Cannibal 94 on August 24th.
Cedar Creek 94 on August 14th.

Number of nights the average low was 65 degrees or greater: **0.**

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Highest average nightly low:	59.8 on September 27th.
Highest low temperatures:	<i>Cedar Creek 70 on August 14th. Huckleberry 68 on August 16th. Cedar Creek 66 on July 7th and August 16th. Goodwin 64 on July 9th.</i>
Coldest low temperature:	<i>Cedar Creek 32 on May 3rd, 4th and 5th. Cannibal 32 on May 4th and 5th.</i>

HUMIDITY

There were two critical daytime humidity days during the season, the same number as 2009. Critical daytime humidity was defined as at least three stations recording 25 percent or less humidity for at least two hours on any given day. There were two critical humidity nights this year, compared to six in 2009. The 10-day average maximum humidity did not go below 90 percent during the 2010 season. The lowest 10-day average was 91.4 July 1-10. The lowest 10-day minimum humidity was 54.3 August 11-20.

Lowest daily average minimum humidity:	23.7% on August 24th. 32.5% on July 6th and 7th.
Lowest single-station minimum humidity:	<i>Cannibal 17% on August 24th. Cedar Creek 17% on July 7th. Tillamook 18% on July 7th. Goodwin Peak 19% on August 24th.</i>
Number of nights with recovery 55% or less:	0
Lowest nighttime average:	70.7% on July 9th. 74.5% on August 24th.
Lowest single-station maximum humidity:	<i>Cedar Creek 31% on August 14th. Cedar Creek 39% on July 7th. . Cedar Creek 45% on July 9th.</i>

PRECIPITATION

Maximum 24-hour (daily) precipitation:	Goodwin Peak 3.03 on June 2nd. Cannibal 1.98 on June 2nd. Cedar Creek 1.66 on June 2nd. Tillamook 1.55 on September 15th.
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FUELS

The 2010 season-average ERC of 16.1 was about the same as the 2009 season-average. There were five 10-day periods with an average ERC of 20 or higher, which equals last year's total. Unlike last year, average ERC values were much lower in September. The 10-day average ERC value was 15.1 at the beginning of September, and then fell to 4.0 by the end of the month. The lowest 10-day 100-hour fuel moisture average was 14.06, which occurred from July 21-31.

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Last year the lowest 10-day average 100-hour fuel moisture value was 12.54. The average 100-hour fuel moisture average at the beginning of June was almost 30, nearly double the value at the same time last year.

Critical ERC Days (40 or higher):	1.
Highest daily average ERC:	40.8 on August 25 th . 39.4 on August 24 th .
Highest single-station ERC:	Cedar Creek 47 on August 25 th . Cannibal 46 on August 25 th . Cedar Creek 46 on August 17 th .
Number of days 100-hr FM was 12 or less:	5 0 days of 10 or less.
Lowest daily 100-hr FM:	11.6 on July 9 th and August 25 th . 11.8 on July 10 th . 12.2 on July 26 th .
Lowest single-station value:	10 – Multiple stations on multiple days
Highest daily 100-hr FM:	33 on June 2 nd 32 on June 10 th

ERC/100-HR 2009 AND 2010

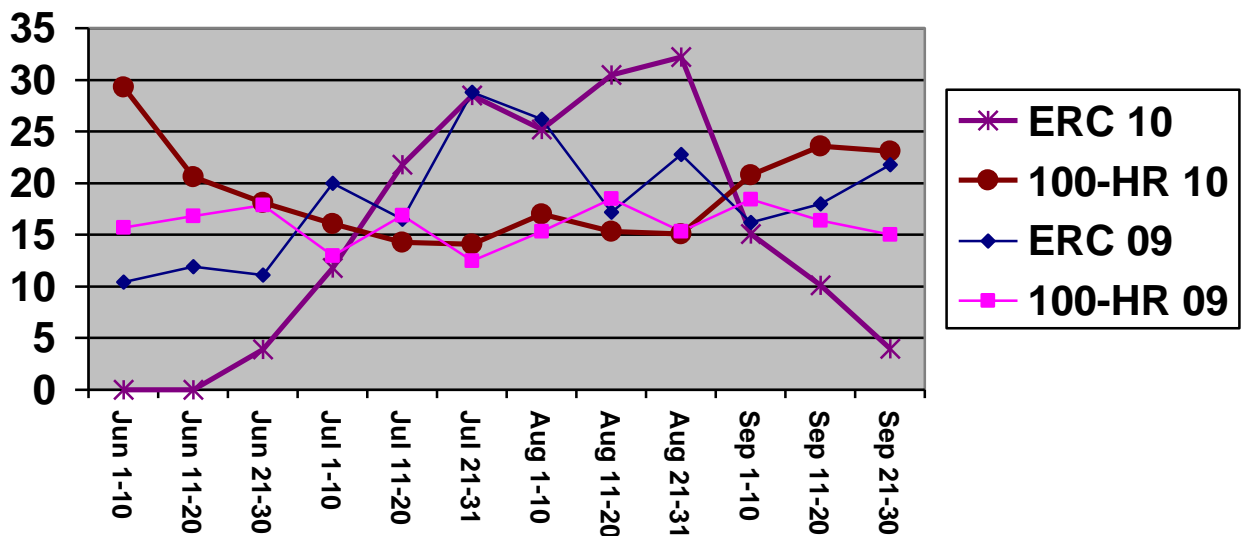


Figure 7 – Fuel Indices Zones 601 and 612

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STATISTICS FOR AREA TWO (COAST RANGE)

This area is comprised of zones 602 and 603. RAWs that represent the area include:

South Fork, Miller, Rye Mountain, Rockhouse1, Wilkinson Ridge, Village Creek, High Point, and Clay Creek, Abernathy Mtn..

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	53.5	35.5	52.8	0	93.3	0	3.25	22.18	6	3	2	2
11- 20	62.5	42.2	53.4	0	94.1	0	6.06	18.18	4	2	2	2
21- 31	56.4	42.1	63.8	0	95.6	0	1.65	25.53	5	3	1	0
June 1-10	58.5	45.7	69.5	0	96.8	0	0.37	25.76	8	7	5	0
11-20	60.7	43.3	60.4	0	93.9	0	2.17	18.92	5	0	0	1
21-30	73.6	48.7	47.2	0	92.7	0	11.04	15.24	0	0	0	0
July 1-10	78.1	52.4	42.1	2	85.0	0	20.75	13.84	2	0	0	0
11-20	75.9	49.1	44.0	0	90.0	0	29.48	12.53	0	0	0	0
21-31	79.4	51.3	42.3	0	89.9	0	34.53	12.93	0	0	0	1
Aug 1-10	74.7	50.8	55.8	0	97.8	0	31.69	15.68	0	0	0	0
11-20	82.5	53.2	37.6	2	88.7	0	38.65	13.44	0	0	0	1
21-31	71.2	48.8	45.9	2	90.2	1	38.18	13.86	2	2	0	0
Sept 1-10	67.0	48.2	60.8	0	96.4	0	21.73	19.46	3	2	1	0
11-20	66.5	51.4	71.8	0	98.8	0	13.99	23.03	6	6	4	0
21-30	69.4	51.8	63.8	0	98.5	0	6.79	23.69	2	1	0	0
Oct 1-10	62.5	46.2	61.6	0	95.8	0	11.52	18.64	0	0	0	0
11-20												
AVE/TOT.	69.38	48.07	53.73	6	93.40	1	19.83	17.58	43	25	15	7
2009	71.65	49.78	48.88	10	92.84	4	25.74	14.46	29	13	6	14
2008	71.1	49.4	49.4	12	86.7	30	26.27	14.16	31	17	8	8
2007	69.3	48.8	56.0	5	93.0	16	22.45	15.00	42	18	12	6
2006	72.9	50.1	46.3	18	86.2	37	30.2	13.7	30	18	9	8
2005	70.8	50.2	51.9	9	88.8	23	23.1	15.8	55	25	13	20
2004	71.5	50.6	54.9	8	93.4	14	17.9	16.3	45	29	16	20
2003	73.0	50.4	48.5	16	88.2	13	33.7	13.7	25	15	7	14
2002	71.9	48.7	48.8	6	90.3	22	29.2	13.9	34	17	7	5

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DRY SPELL

2010	2009	2008	2007	2006	2005	2004	2003
80 DAYS	46 DAYS	68 DAYS	38 DAYS	63 DAYS	83 DAYS	53 DAYS	80 DAYS

AREA HIGHLIGHTS

OVERVIEW

Overall, the 2010 fire season was benign. It was cooler and more moist than 2009, but had a much longer dry spell. The 2010 seasonal high temperature was 2.3 degrees cooler than last year, and rivaled the 2007 season. The average daytime humidity was almost 5 percent higher than 2009. There were six critical humidity days, which was the least since 2007. The past two years have seen a dramatic drop in the number of critical humidity nights. In 2010 there was one such night, and only 4 last year. Prior to 2009, the seasonal average was 22 critical humidity nights. It was much wetter in 2010 compared to last year. Note the number of days when the median precipitation was one-tenth and one-quarter of an inch or more. There were 15 wetting rain days, compared to 6 in 2009. The 15 wetting rain days was the most since 2004. Lightning was noticeably absent in 2010, with only 7 lightning days during the season. Five of the lightning days occurred before June 20th.

Seasonal fuel conditions were lower (more wet) than 2009. The seasonal average ERC was 19.8, nearly six points lower than last year. The peak 10-day average ERC was 38.7 during the period August 11-20. Last year there was one 10-day period when the average ERC exceeded 40. That did not happen in 2010. Critical ERC conditions, defined as a daily average of 45 or higher, occurred on 2 days, August 24th and 25th. Last year there were five critical ERC days. Similar to all other areas, the period of highest fire potential was short. The meat of the fire season was from mid-July through August. Fuel conditions abated in early September.

RAWS NOTES: Data collection ended October 10th. Clay Creek data available May 2nd through July 22nd.

TEMPERATURE

The seasonal average of 69.4 was 2.3 degrees cooler than 2009.

The warmest 10-day period: **August 11-20 (82.5 degrees).**

Number of days when the average high was 85 degrees or higher: **13.**

Highest daily average high: **94.3 on July 8th.**
93.6 on July 9th.
92.9 on August 25th.

Highest temperatures: **Village Creek 99 on August 14th.**
Wilkinson 99 on July 9th.
Rockhouse 98 on August 16th and 25th.
Village Creek 98 on August 25th.

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Number of nights the average low was 65 degrees or greater: **0.**

Highest average nighttime low: **63.4 on July 9th.**
59.6 on August 25th.
59.4 on August 14th.

Highest low temperatures: **Rockhouse 72 on July 8th, 9th, August 25th.**
Rye Mountain 70 on July 7th.
South Fork 70 on July 8th, and August 15th.

Coldest low temperatures: **South Fork 31 on May 4th and 5th.**
Abernathy Mtn. 31 on May 3rd through 5th.

HUMIDITY

There were 6 critical daytime humidity days during the season, compared to 10 in 2009. Critical daytime humidity was defined as at least four stations recording 25 percent or less humidity for at least two hours on any given day. The lowest 10-day average minimum humidity was 37.6 percent August 11-20. Last year, the lowest 10-day minimum was 36.5 percent. There were two 10-day periods in 2009 with an average daytime humidity of 40 percent or less, but just one in 2010.

Lowest daily average minimum humidity: **21.1% on August 24th.**
21.5% on July 7th.
22.8% on August 14th.

Lowest single-station minimum humidity: **Rye Mountain 15% on August 24th.**
Rockhouse 16% on July 25th, and
Aug 24-25th
Rockhouse 17% on July 9th.

Number of nights with recovery 55% or less: **0.**

Lowest nighttime average: **59.1% on August 24th.**
61.1% on July 9th.

Lowest single-station maximum RH: **Rockhouse 35% on August 14th.**
South Fork 36% on August 14th.
Rockhouse 37% on August 25th.
Rye Mountain 39% on July 7th.

PRECIPITATION

Maximum 24-hour (daily) precipitation: **South Fork 1.79 on June 2nd.**
Rye Mountain 1.68 on June 6th.
Wilkinson 1.60 on June 2nd.
Village Creek 1.56 on June 2nd.

FUELS

The 2010 season-average ERC of 19.8 was lower than the 25.7 of last season, and the lowest since 2004. The average ERC did not exceed 20 until early July. The most significant hot spell

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of 2010 occurred in mid-August, and resulted in a peak 10-day average ERC value of 38.7. Three weeks later the 10-day average ERC had dropped to 21.7. A major wet spell in mid-September pushed average ERC values to near 10. The lowest daily-average 100-hour fuel moisture value in 2010 was 10.25. Last year the lowest average value was 7. In 2009 there were 16 days when the average 100-hour fuel moisture value was 10 or lower, but none in 2010.

Critical ERC Days (45 or higher): **2.**

Highest daily average ERC: **49.4 on August 25th.**
 45.0 on August 24th.
 44.0 on August 17th.

Highest single-station ERC: **Rockhouse 64 on August 25th .**
 Village Creek 58 on August 25th.

Rockhouse exceeded 55 on 17 days.

Number of days 100-hr FM was 10 or less: **0.** Days of 8 or less: **0**

Lowest daily 100-hr FM: **10.25 on July 10th .**
 10.38 on July 9th .
 10.57 on August 25th.

Lowest single-station value: **Rockhouse 7 on August 17th.**
 Rockhouse 8 on many days

Highest daily 100-hr FM: **32.4 on September 20th.**
 30.9 on September 19th.

MAX T/MIN RH 2009 AND 2010

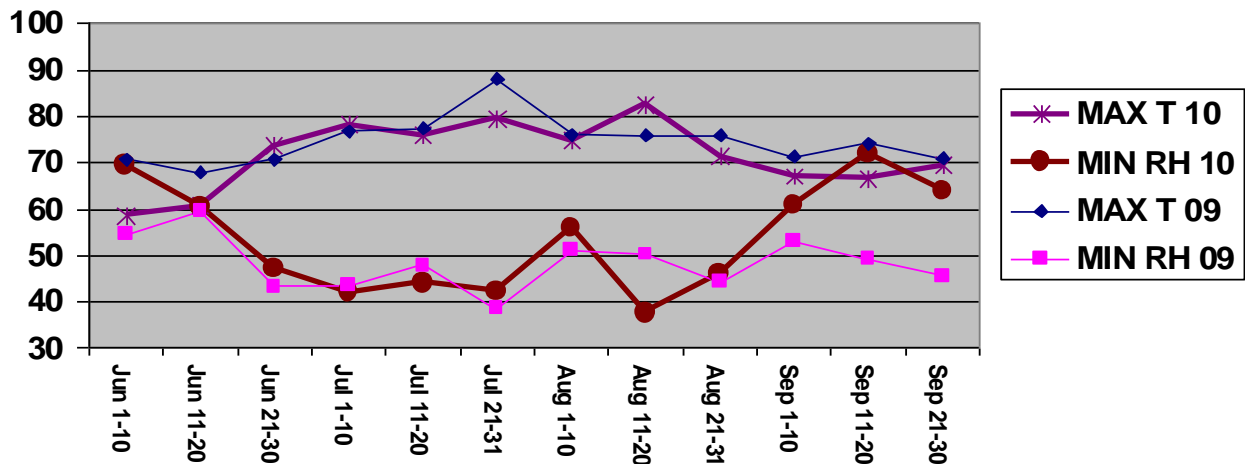


FIGURE 8 – MAX TEMP AND MIN RH ZONES 602 AND 603

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STATISTICS FOR AREA THREE (SOUTH WASHINGTON CASCADES, NORTH OREGON CASCADES, AND FOOTHILLS)

This area is comprised of zones 605, 607 and 660. RAWs that represent the area include:
Log Creek, Red Box Bench, Horse Creek, Eagle Creek, Blue Ridge, Elk Rock, Buck Creek, Canyon Creek, Stayton (later Jordan), 3-Corner Rock, Locks, Dry Creek, and Wanderer's Peak.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			6 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	52.4	34.1	59.7	0	97.5	0	2.18	22.89	7	6	2	0
11- 20	61.7	41.2	56.0	0	95.9	0	4.99	19.18	4	4	3	2
21- 31	54.5	39.8	67.8	0	98.6	0	1.22	25.03	6	4	2	1
June 1-10	58.0	43.4	71.2	0	98.5	0	0.48	28.31	8	6	6	0
11-20	56.5	41.1	66.8	0	96.4	0	1.48	21.48	6	3	1	1
21-30	70.5	47.2	45.5	0	94.2	0	7.54	16.10	0	0	0	0
July 1-10	71.9	50.2	44.9	3	84.5	2	15.53	14.28	3	1	1	0
11-20	72.7	47.9	44.0	0	90.9	0	27.24	12.00	0	0	0	0
21-31	80.2	53.5	35.9	2	83.3	0	37.67	11.37	0	0	0	0
Aug 1-10	73.7	51.8	52.2	0	95.3	0	35.94	14.36	0	0	0	0
11-20	81.9	54.7	31.3	6	76.2	3	44.65	11.68	0	0	0	1
21-31	68.8	46.5	43.7	2	86.0	2	43.57	12.38	1	1	1	0
Sept 1-10	64.0	46.1	59.6	0	94.6	0	22.39	19.54	4	3	1	0
11-20	67.2	48.9	62.0	0	97.6	0	14.41	22.30	6	6	6	1
21-30	69.5	48.9	55.7	0	95.2	0	7.04	21.91	2	2	0	0
Oct 1-10	62.9	44.5	54.6	0	91.4	0	15.50	16.43	0	0	0	0
11-20												
AVE/TOT.	67.85	46.94	51.81	13	91.65	7	20.05	17.27	47	36	23	6
2009	70.22	48.79	45.46	27	88.81	11	24.75	15.30	32	16	7	12
2008	68.4	48.2	50.0	19	87.5	40	20.50	16.25	44	25	9	8
2007	67.5	47.3	50.8	13	89.6	17	24.0	14.3	48	24	16	14
2006	71.1	48.9	43.3	30	82.1	45	27.7	14.3	35	24	10	15
2005	67.8	47.8	50.4	15	88.4	29	20.2	16.2	61	38	19	18
2004	68.5	49.3	51.5	14	87.0	33	17.9	16.1	57	37	22	28
2003	70.1	48.7	46.9	27	84.7	25	32.2	13.5	33	23	13	15
2002	68.5	47.2	48.8	13	86.5	30	29.7	13.4	40	22	9	11

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DRY SPELL

2010	2009	2008	2007	2006	2005	2004	2003
59 DAYS	83 DAYS	51 DAYS	31 DAYS	48 DAYS	37 DAYS	53 DAYS	77 DAYS

AREA HIGHLIGHTS

OVERVIEW

This area was cooler and wetter than last year. The frequency of onshore low-level flow prevented persistent large-scale subsidence inversions. Therefore, there were fewer critical humidity nights. The 7 critical humidity nights were the fewest since at least 2000. Another thing that stands out is the number of wetting rain days. There were 23 wetting rain days in 2010, but just 7 last year. The 59-day dry spell was longer than the 8-year average, but it was sandwiched by an extremely wet June and September.

Average ERC values were near zero through mid-June and less than 10 at the end of June. Once the rain shut off, average ERC values exhibited a rapid increase. By the end of July the average ERC value was 36.7, only 10 days behind last year's pace. The highest 10-day average ERC, 44.7, occurred August 11-20. Critical fuel conditions, defined as daily average ERC value of 45 or greater, occurred on 12 days, compared to 16 days in 2009. The highest daily average ERC was 54.1, which exceeded the 97th percentile. Last year the highest daily average was 55.1. The 100-hour fuel moisture content dipped below 10 percent on 12 days. Last year there were 33 occurrences.

Lightning frequency was low compared to previous years. There were six lightning days, four of those occurring in the spring.

TEMPERATURE

The seasonal average of 67.9 was about 2.5 degrees cooler than 2009.

The warmest 10-day period: **August 11-20 (81.9 degrees).**

Number of days when the average high was 90 degrees or higher: **6**

Highest daily average high: **92.8 on August 16th.
92.5 on August 15th.
92.3 on August 25th.**

Highest temperatures: **Locks 101 on July 8th.
Canyon Creek 101 on August 15th.
Locks 100 on August 15th.
Canyon Creek 98 on July 8th, August 14th and 16th.**

Number of nights the average low was 65 degrees or greater: **0.**

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Highest nightly average low:	64.3 on August 15th. 63.8 on July 8th. 63.3 on August 16th.
Highest low temperatures:	<i>Dry Creek 71 on August 16th. Log Creek 70 on August 15th. Horse Creek 69 on July 8th. Canyon Creek 69 on August 15th.</i>
Coldest low temperature:	<i>Wanderer's Peak 26 on May 3rd through 5th. Blue Ridge 27 on May 3rd and 4th. Blue Ridge 28 on May 5th. Wanderer's Peak 28 on May 6th.</i>

HUMIDITY

There were 13 critical daytime humidity days during the season, compared to 27 in 2009. Critical daytime humidity was defined as at least six stations recording 25 percent or less humidity for at least two hours on any given day. There were 7 critical humidity nights this year, compared to 11 in 2009. The lowest daily average maximum humidity of 45.8 percent was over 7 percent higher than the 2009 lowest value. The lowest 10-day average minimum humidity was 31.3 percent August 11-20. There were two 10-day periods when the average minimum humidity was 40 percent or less. The lowest 10-day average nighttime humidity was 76.2 percent August 11-20.

Lowest daily average minimum humidity:	<i>17.3% on August 24th. 18.4% on August 25th. 19.8% on July 7th. 20.1% on August 16th.</i>
Lowest single-station minimum humidity:	<i>Buck Creek 9% on August 17th. Eagle Creek 12% on Aug. 14th and 24th. Red Box 12% on August 16th.</i>
Number of nights with recovery 55% or less:	5.
Lowest nighttime average:	<i>45.8% on August 14th. 48.5% on August 15th. 49.5% on August 24th. 51.5% on August 16th.</i>
Lowest single-station maximum RH:	<i>Horse Creek 30% on August 24th. Log Creek 33% on August 15th. Canyon Creek 34% on August 14th. Horse Creek 34% on August 14th.</i>

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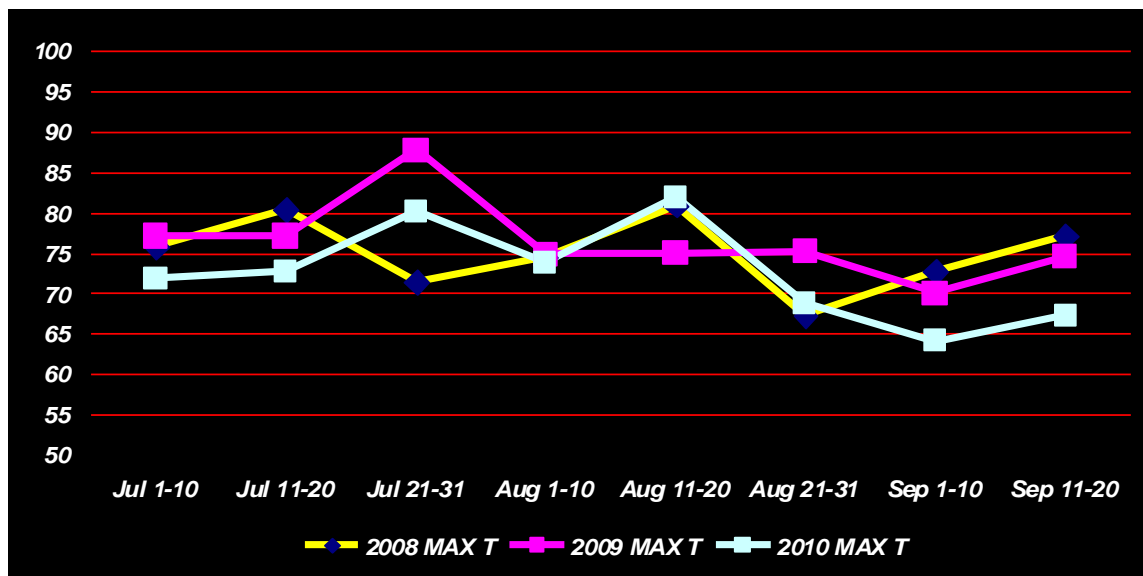


FIGURE 9 – 10-DAY AVERAGE MAX. TEMPERATURES ZONES 605, 607, AND 660

VIEW LAKE COMPLEX: The View Lake Complex was comprised of several fires in the Mt. Hood and Willamette National Forests. The most significant hot and dry spell of the season occurred August 10th through the 15th. The strong upper level ridge pattern broke down on the 16th, and was followed by a lightning outbreak on the 17th. Several fire starts occurred in the Olallie Lake Scenic Area, Mt. Jefferson Wilderness, and the Bull of the Woods Wilderness. The primary driver of these fires was the inordinate amount of dead and down fuels. Another contributor to fire spread, primarily torching, was dead and lichen-draped standing timber.

Fuel conditions at the time of ignition were at the most extreme values of the season. ERC values for RAWS stations in zone 607 ranged from 50 at Log Creek to 58 at Red Box Bench and Blue Ridge. The 58 at Red Box exceeded the 97th percentile value.

The Incident Command Post (ICP) was located at the Ripplebrook Ranger Station. On August 26th the complex comprised 579 acres. By September 5th the complex had burned 4,736 acres. The biggest fires were The Bull of the Woods, 2,781 acres, and the Pyramid Fire, at 1,760 acres.

The Pacific Northwest Team 2 Type I Incident Management Team was assigned to the complex. It was then turned over to the Portland NIMO team. At 0600 September 8th, the local Type III Management organization assumed command of the complex. The Portland office provided IMET support on this incident. The Portland office also fulfilled spot forecast requests for the Type III management team.

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STATISTICS FOR AREA FOUR (CENTRAL CASCADES AND FOOTHILLS)

This area is comprised of zones 606 and 608. RAWs that represent the area include:

Boulder Creek, Yellowstone, Trout Creek, Brush Creek, Pebble, Fields, and Emigrant.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	51.5	32.4	52.4	0	98.9	0	0	26.00	7	4	3	1
11- 20	59.7	39.3	55.9	0	98.5	0	0.32	24.89	6	4	2	3
21- 31	54.2	38.7	63.2	0	99.2	0	0	24.43	5	5	3	2
June 1-10	58.3	43.1	70.5	0	99.4	0	2.33	26.56	8	7	6	1
11-20	58.4	40.5	58.7	0	98.2	0	0.14	20.89	5	1	0	0
21-30	74.1	46.9	41.2	0	94.5	0	8.47	14.92	0	0	0	0
July 1-10	77.1	49.5	36.0	3	85.5	2	19.93	13.28	2	1	0	2
11-20	79.2	48.8	33.0	1	87.5	0	33.16	11.21	0	0	0	0
21-31	83.6	53.0	33.4	1	85.6	0	41.51	11.36	0	0	0	3
Aug 1-10	78.9	50.4	38.3	0	92.9	0	42.21	13.16	0	0	0	0
11-20	85.6	53.3	27.1	6	83.3	1	49.20	11.39	1	1	0	1
21-31	72.0	46.3	37.1	3	84.2	2	46.84	12.25	2	1	1	0
Sept 1-10	67.7	45.4	53.4	0	95.3	0	24.43	19.47	4	4	3	0
11-20	69.3	48.9	56.5	0	95.7	0	17.41	19.96	4	3	3	2
21-30	74.2	49.7	46.5	1	93.7	0	13.10	20.14	1	0	0	0
Oct 1-10	64.3	44.4	55.0	0	95.7	0	20.05	16.73	0	0	0	0
11-20												
AVE/TOT.	70.72	46.40	45.99	15	92.29	5	25.02	16.22	45	31	21	15
2009	73.42	47.46	40.21	35	88.83	12	29.96	13.35	31	18	8	18
2008	73.0	48.1	42.6	28	85.0	42	26.87	13.85	40	22	11	10
2007	70.5	46.8	44.8	18	89.4	19	28.9	13.3	35	25	20	12
2006	73.9	48.6	39.6	37	82.0	42	29.4	13.5	33	25	16	17
2005	70.5	47.3	45.6	20	88.7	29	23.7	15.6	58	36	18	19
2004	71.8	49.0	45.6	19	86.5	30	23.3	14.8	43	26	20	24
2003	73.4	49.0	42.3	43	83.5	29	38.8	12.2	30	19	6	17
2002	72.4	47.4	40.7	29	84.6	43	37.5	12.2	30	14	9	13

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DRY SPELL

2010	2009	2008	2007	2006	2005	2004	2003
45 DAYS	29 DAYS	51 DAYS	30 DAYS	89 DAYS	51 DAYS	73 DAYS	67 DAYS

AREA HIGHLIGHTS

OVERVIEW

The 2010 season was the coolest since 2007, and the wettest since 2005. The frequent onshore low-level flow patterns resulted in a seasonal average daytime humidity of 46%, which was the highest value since at least 2002. Note that there were just 15 critical humidity days, compared to 35 in 2009. The overall average humidity recovery was the highest since at least 2002. The five critical humidity nights was the fewest since 2002. This low number may be attributed to the methodology used to determine humidity recovery of 60 percent or less. In the past, only the hours from midnight to 0700 were considered. This year, the late-evening hours were also incorporated. Often, humidity on slopes and lower ridges will increase during the evening, before subsidence inversions become firmly established. Thus, the maximum RH is likely to occur before midnight.

The most extreme portion of the fire season lasted from mid-July through the end of August, a span of about seven weeks. An extremely wet May and June resulted in average ERC values near zero through June 20th, and below 10 by early July. Last year the average ERC value was close to 25 by June 30th. ERC values rose to 40 by July 20th and remained above 40 through the end of August. The highest 10-day average was 49.2 August 11-20. Last year the highest 10-day average was 51.4. Average daily ERC values exceeded 50 on 9 days, compared to 15 days in 2009.

The highest 10-day average high temperature was 85.6 August 11-20. This was five degrees cooler than the highest 10-day average in 2009. Numerous onshore flow events throughout the summer resulted in higher daytime humidity, but fewer thermal trough events. Persistent large-scale subsidence inversions were infrequent. The area experienced two Red Flag events, both during the latter half of August. A lightning episode on August 17th resulted in the Scott Mountain Fire, near McKenzie Pass.

The 2010 season was much wetter than 2008 and 2009, as evidenced by the number of days with median precipitation of one-tenth of an inch to one-quarter of an inch, and over one-quarter of an inch. There were 21 wetting rain days, defined as median precipitation of 0.25 inches or more. Last year there were only eight wetting rain days. The first three weeks of September were wet, with six wetting rain days. The dry spell was a relatively short 45 days. The dry spell started on July 3rd and ended on August 17th.

Lightning frequency was close to the past 15-year average, but still less than 2009. It is interesting to note that the North Oregon and South Washington Cascades and foothills had just two lightning days from July 1st through September. The Central Oregon Cascades and foothills had eight days during the same period. There were several instances when unstable south flow occurred in zones 606 and 608, but more stable southwest to west flow aloft took place in zones 605, 607, and 660.

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TEMPERATURE

The seasonal average of 70.7 was 2.7 degrees cooler than 2009.

The warmest 10-day period: **August 11-20 (85.6 degrees).**

Number of days when the average high was 90 degrees or higher: **11.**

Highest daily average high: **95.9 on August 25th.**
94.7 on August 16th.
93.7 on August 14th.
92.9 on August 24th.

Highest temperatures: **Trout Creek 100 on August 14th.**
Trout Creek 99 on July 7th.
Emigrant 99 on August 25th.
Trout Creek 98 on August 24th.

Number of nights the average low was 65 degrees or greater: **0.**

Highest average nightly low: **61.7 on July 9th and August 25th.**
61.3 on July 8th.
60.4 on August 16th.

Highest low temperatures: **Yellowstone 68 on July 8th, August 15th and 25th.**
Brush Creek 68 on August 25th.
Brush Creek 67 on July 9th.
Fields 67 on July 9th.
Yellowstone 67 on August 16th.

Coldest low temperature: **Boulder Creek 26 on May 9th.**
Pebble 27 on May 6th.
Emigrant 28 on May 4th and 5th.
Fields 28 on May 4th.
Boulder Creek 28 on May 4th.

HUMIDITY

There were 15 critical daytime humidity days during the season, compared to 35 in 2009. Critical daytime humidity was defined as at least four stations recording 25 percent or less humidity for at least two hours on any given day. The lowest 10-day average minimum humidity was 27.1 percent August 11-20. The lowest 10-day humidity recovery period was 83.3 percent during the same period.

Lowest daily average minimum humidity: **14.9% on August 24th.**
15.7% on August 25th.
16.9% on July 7th.
18.6% on August 14th.

Lowest single-station minimum humidity: **Emigrant 11% on August 23rd and 24th.**
Yellowstone 11% on August 24th.

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Number of nights with recovery 55% or less: **4.**

Lowest nighttime average: *46.3% on August 25th.
47.1% on August 24th.
50.7% on July 7th.*

Lowest single-station maximum RH: *Emigrant 26% on August 24th.
Emigrant 32% on August 14th.
Yellowstone 33% on August 14th, 24th.*

PRECIPITATION

Maximum 24-hour (daily) precipitation: *Yellowstone 3.50 on June 2nd.
Pebble 2.72 on June 2nd.
Boulder Creek 2.30 on June 2nd.
Trout Creek 2.16 on June 2nd.*

FUELS

The 2010 season-average ERC was 25.0 or nearly five points lower than the 2009 average. Average ERC values remained near zero through the third week of June, and reach 10 in early July. Last year the average ERC had reached 40 by July 10th. In 2010 the average ERC was only 20. The 10-day average 100-hour fuel moisture content did not fall below 10 percent in 2010. Last year there were three 10-day periods. The average daily 100-hour fuel moisture fell below 10 percent on 11 days in 2010. This was a stark contrast to the 47 days last year. There were nine days when the average daily ERC exceeded 50, compared to 15 in 2009.

Critical ERC Days (50 or higher): **9.**

Highest daily average ERC: *58.1 on August 25th.
56.3 on August 17th.
54.3 on August 24th.*

Highest single-station ERC:
(*Non-Emigrant*) *Emigrant 77 on August 25th.
Yellowstone 65 on August 25th.*

NOTE: Emigrant exceeded 70 on 7 days.

Number of days 100-hr FM was 10 or less: **11.** 8 or less: **0.**

Lowest daily 100-hr FM: *8.57 on August 17th.
8.71 on August 26th.
9.00 on August 25th.*

Lowest single-station value: *Emigrant 6 on August 16th, 17th, 25th,
and 26th.
Yellowstone 7 on August 17th.
Emigrant 7 on multiple days.*

Highest daily 100-hr FM: *30.4 on June 3rd.
30.1 on June 2nd.*

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CRITICAL FIRE WEATHER EVENTS

Critical Fire Weather conditions are those that **COULD** result in extreme fire behavior, or, in the case of problem or dry lightning, an abnormally high number of ignitions. One must be careful when assessing problem lightning. There are times when lightning activity does not meet Red Flag criteria (at least LAL 3 coverage), but does result in a high incidence of project fires.

The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This in itself could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical or extreme level normally requires an additional weather element, or trigger, to be superimposed on the dryness. This additional trigger could be problem or dry lightning, an extremely unstable air mass, or a combination of strong wind and low humidity. Red Flag Warnings are issued when a combination of critical weather exists **WITH** sufficiently dry fuels and severe burning conditions. The Red Flag criteria for the Portland Fire Weather district are listed below:

CRITERIA FOR STRONG WIND AND LOW HUMIDITY (NIGHT)

ZONES 601 AND 602: Two stations must report 35% humidity or less **AND** 10-minute wind speed of 10 mph or more for 3 hours in an 8-hour block.

ZONES 603 AND 612: Rockhouse1 RAWs must report 35% humidity or less **AND** 10-minute wind speed of 15 mph or more for 4 hours in an 8-hour block **AND** one other RAWs must report 35% or less humidity **AND** 10-minute wind speed of 10 mph or more for 2 hours.

ZONE 604: Two stations (airports) must report 30% humidity or less **AND** 2-minute wind speed of 15 mph or more for at least 4 hours in an 8-hour block.

ZONES 605, 607, AND 660: One station must report 35% humidity or less **AND** 10-minute wind speed of 10 mph or more for 4 hours in an 8-hour block **AND** at least **TWO** other stations must report 35% or less humidity **AND** 10-minute wind speed of 10 mph or more for at least 2 hours.

ZONES 606 AND 608: One station must report 30% humidity or less **AND** 10-minute wind speed of 10 mph or more for at least 4 hours in an 8-hour block **AND** one other station must report the same for at least 1 hour.

CRITERIA FOR STRONG WIND AND LOW HUMIDITY (DAY)

At least 2 stations within a zone must report 25% humidity or less **AND** wind speed of 10 mph or more (except 15 mph in zone 604) for at least 4 hours in an 8-hour block.

CRITERIA FOR DRY AND UNSTABLE AIR MASS (HAINES 6)

At least **ONE** station within a zone must report 25% humidity or less **AND** show a high-level Haines value of 6 **AND** fuel conditions (Dryness Levels) are in the "BROWN". At forecaster discretion, can also be issued when Dryness Levels are "YELLOW".

PROBLEM LIGHTNING

Dryness Levels **MUST** be in the "BROWN" and expected lightning frequency is such that multiple starts (about 5-7) are expected. Typically scattered or LAL 3 coverage. At forecaster discretion, can also be issued when Dryness Levels are "YELLOW".

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There were two critical fire weather events during the 2010 fire season. One event was for a combination of lightning and a dry/unstable air mass, and the other was for wind and low humidity and also mid-level Haines 6 conditions associated with a thermal trough passage.

1. AUGUST 17, 2010 LIGHTNING, DRY AND UNSTABLE AIR MASS AND CRITICAL FUELS

This was the only Red Flag lightning event of the 2010 season. A strong 500 mb ridge was over the Pacific Northwest on August 16th (figure 10). Note the closed low off the North California Coast. The flow aloft was weak, with 500 mb wind speeds of 10 knots or less over the forecast area. Afternoon high temperatures for the Cascade zones were in the upper 80s to upper 90s. Canyon Creek RAWS reached 98 degrees. The average ERC value on the 16th for zones 605, 607, and 660 was 51. In zones 606 and 608 the average ERC value was 54. These represent values above the 90th percentile for any given year.

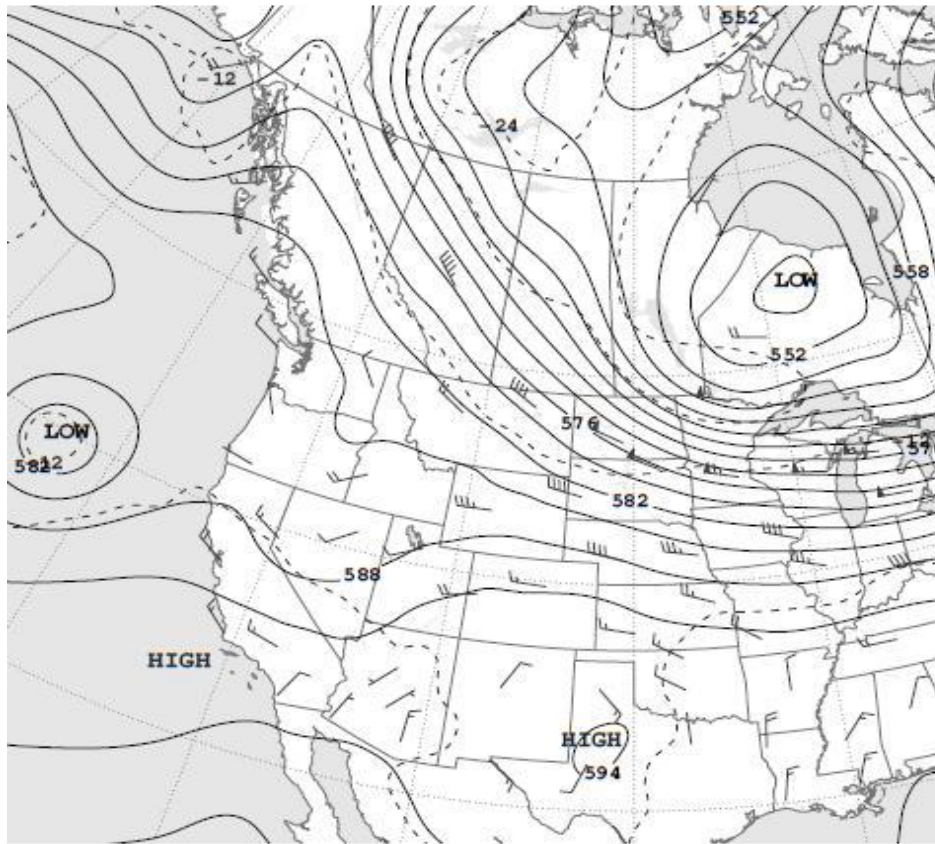


Figure 10 – 500 mb chart 0500 PDT August 16, 2010

At 0500 PDT on the 17th, the surface thermal trough was centered near the Coast Range. The mid-level Haines at Salem was a 5. The 500 mb ridge axis had shifted to near the Cascade Crest as the upper low edged closer to the North California coast. This pattern,

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the breakdown of an upper level ridge, is typical of summer lightning events in the Pacific Northwest. At 0500 PDT south 500 mb flow was over Southern Oregon, but southwest to west flow aloft covered much of the forecast area. At 1100 PDT short-range models forecast the surface thermal trough to be over the Cascades and into the Columbia Basin and south 700 mb flow extending to the north end of zones 606 and 608.

The average ERC for the North Oregon and South Washington Cascades and foothills on the 17th was 52.5, and 56.3 for zones 606 and 608. Some locations reported 100-hour fuel moisture content of 6 to 7 percent, which would be the most extreme of the 2010 fire season. Lightning began in zones 607 and 608 around 1530 PDT. The brunt of the lightning was over the Willamette NF, and south half of the Mt. Hood NF. The North Oregon Cascade foothills had isolated strikes, with scattered covered in zone 606. There was a definite lightning boundary. Areas in the Cascades north of Mt. Jefferson had little to no lightning.

WARNING CHRONOLOGY: A Red Flag Warning was issued at 1225 PDT on the 16th, covering zones 607, 608, and 660, and was valid from 1100 PDT to 2300 PDT on the 17th. The warning was updated at 1212 PDT on the 17th. Zone 660 was dropped from the warning in the update.

VERIFICATION: Lightning was observed in warned zones 607 and 608, beginning at 1530 PDT. Lightning did not occur in zone 660. The Willamette and Mt. Hood NF reported several fire starts due to the lightning. The dry and unstable part of the warning was difficult to verify. There was a thermal trough passage during the late-morning and afternoon of the 17th, but the Salem upper air soundings from 0500 PDT and 1700 PDT on the 17th showed mid-level Haines values of 5.

A Fire Weather Watch was not issued for this event. The average warning lead time was close to 15 hours.

2. AUGUST 24-25, 2010 WIND AND LOW HUMIDITY AND DRY AND UNSTABLE CONDITIONS

This was primarily an offshore flow event, but also included a thermal trough passage. The event occurred during the most pronounced heat wave of the season. On August 24th several inland RAWS locations observed high temperatures in the mid to upper 90s. Trout Creek, zone 606, hit 98, and Emigrant, zone 608, reached 97.

Strong high pressure aloft was centered over the Sierras on the 24th, with the general storm track confined to Canada. The surface pattern (see figure 11 on the next page) valid at 0500 PDT on the 24th clearly showed the offshore low-level flow pattern with the surface thermal trough just off the coastline. At 1100 PDT the thermal trough was analyzed along the North and Central Oregon coastline, but just inland from the South Oregon coastline. The Salem and Medford morning upper air soundings on the 24th indicated mid and high-level Haines 5. Critical fuel conditions existed on the 24th in the Cascades and foothills, with daily average ERC values over 50.

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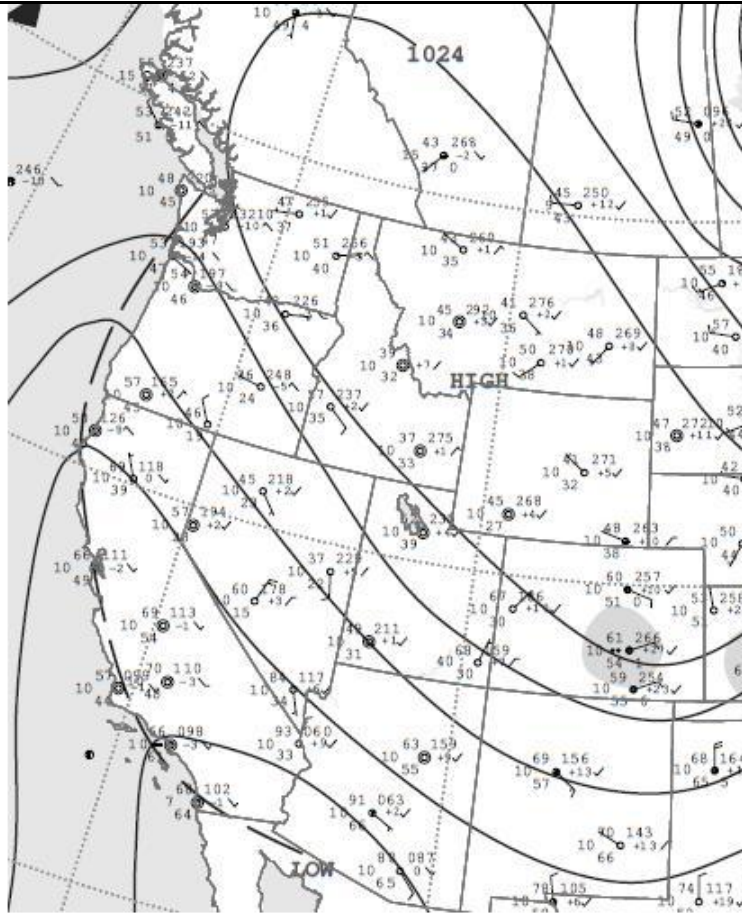


Figure 11 – Surface analysis 0500 PDT August 24, 2010

The upper air pattern at 0500 PDT on the 25th remained virtually unchanged from the previous day. The 500 mb high pressure center drifted a little east into Utah. The surface thermal trough remained along the Oregon and Washington coastline. The average humidity recovery in zones 606 and 608 was 46 percent. This was the lowest daily average for the season. Several locations in the Coast Range and Cascades observed early-morning humidity values below 35 percent. At 0300 PDT Emigrant recorded just 21 percent. Three-Corner Rock, Elk Rock and Dry Creek, all in zone 660, were under 30 percent.

Figure 12 (see next page) shows the 15-hour model forecast, valid at 0800 PDT on the 25th, for the thermal trough. A hand-analysis valid at 0600 PDT put the thermal trough from west of Sexton Summit to near Seattle (see dashed black line on figure 12). The model appeared to be slightly fast moving the thermal trough east. The 0500 PDT Salem upper air sounding from the 25th yielded a mid-level Haines 6, and a high-level Haines 5. The Medford sounding had a mid-level Haines 6, but a high-level value of 4.

By 0900 PDT the thermal trough had moved very little since 0600. It remained centered directly over the Willamette Valley

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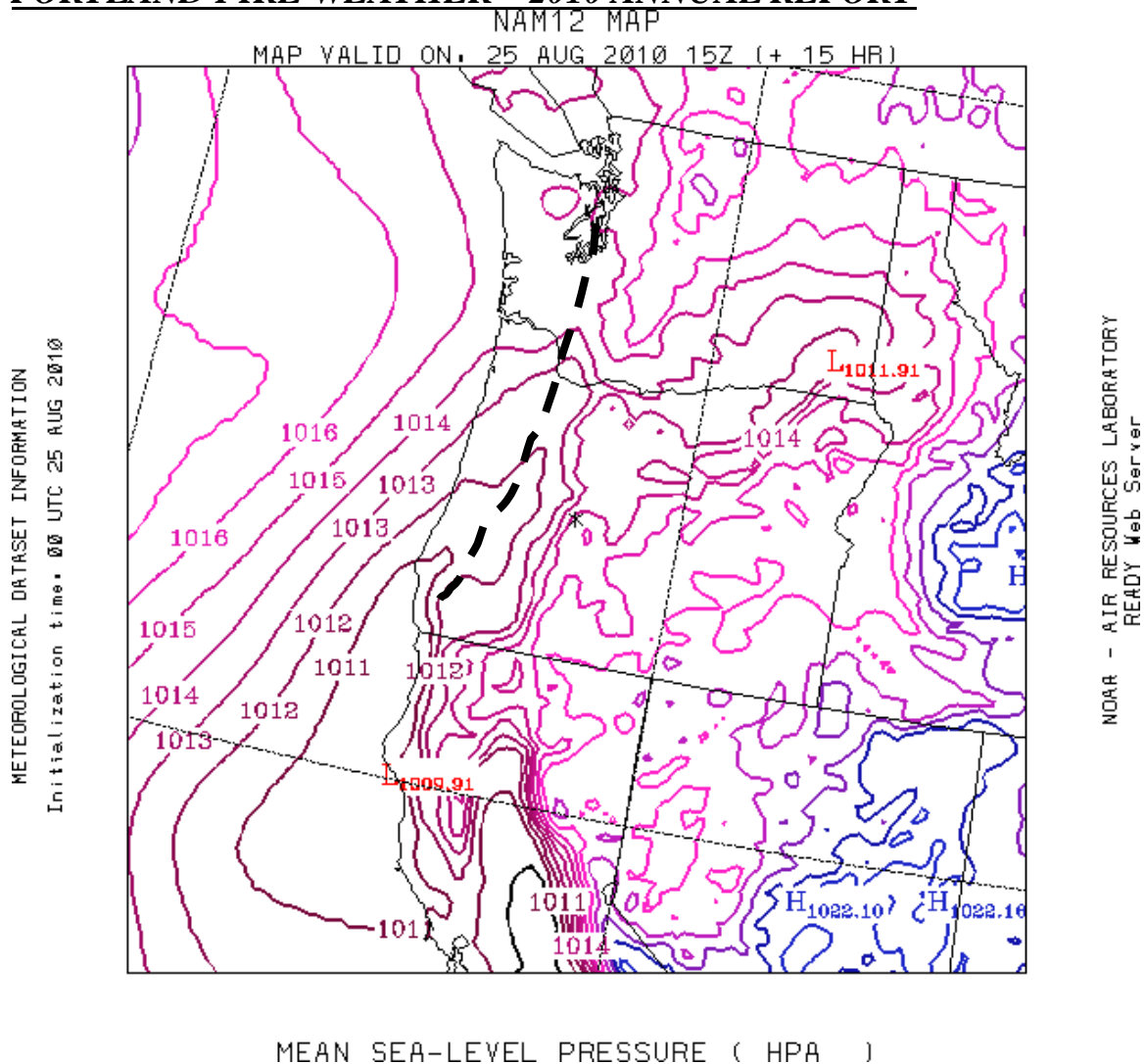


Figure 12 – 15-hour model MSL forecast valid 0800 PDT, August 25, 2010.

The thermal trough showed signs of slow eastward progression in the late-morning hours of the 25th. At 1200 PDT forecaster analysis put the thermal trough in the east part of the Willamette Valley, and also in the Columbia River Gorge. At 1400 PDT it had reached the Cascades. On the 25th, the most extreme fuel conditions of the season were noted in the Central Oregon Cascades and foothills. The average ERC was 58. Emigrant recorded an ERC of 77, while Yellowstone observed a 65. Buck Creek and Dry Creek, in zone 660, came in with ERC values of 63. The Scott Mountain Fire and View Lake Complex exhibited active fire behavior with smoke plumes visible for many miles, indicative of dry and unstable conditions associated with a thermal trough passage.

WARNING CHRONOLOGY: The initial Red Flag Warning was issued at 0714 PDT on the 24th. The warning included zones 604, 605, 606, 607, 608, and 660, and was valid through 2300 PDT. An update was issued at 1449 PDT, primarily to extend the warning valid time. The warning remained valid through 2300 PDT for zone 604, but was extended to 2000 PDT of the 25th for the remaining zones. The next update, at 2307 PDT, extended the warning for zone 604 to 2000 of the 25th. Another update was issued

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at 1125 PDT on the 25th, but no changes were made. An ending statement was at 1959 PDT.

VERIFICATION: The Willamette Valley, zone 604, verified during the afternoon and early evening of the 24th. Aurora, Eugene, Troutdale, and Salem observed sustained wind speeds of 15 mph or more, or gusts exceeding 25 mph, with humidity values below 25 percent. Unfortunately, the North Oregon and South Washington Cascades had already met criteria before the initial warning was issued. Three-Corner Rock had gusts up to 40 mph during the early-morning hours of the 24th. Zone 606, the Central Oregon Cascade foothills, also met criteria before the warning was issued. Green Mountain RAWS observed with speeds of 10 to 15 mph with gusts to 20 mph and humidity of 25 percent or less from 0100 PDT to 0900 PDT on the 24th.

The thermal trough moved across zone 608 in the mid to late-afternoon hours of the 25th. Extreme fire behavior was observed on the Scott Mountain Fire and View Lake Complex, supporting the dry and unstable conditions due to the thermal trough. The 1700 PDT upper air soundings at Salem and Medford showed mid-level Haines 6 conditions.

A Fire Weather Watch was not issued for this event. Warning lead time ranged from zero to 22 hours. Zones 606, 607, and 660 had no lead time.

National Weather Service

Fire Weather Program



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FORECASTS AND SERVICES

SPOT FORECASTS

The spot total for 2010 was about the same as 2009. There were 120 spot forecasts issued in 2010, and 115 in 2009. There were 51 wildfire spot forecast requests, which was slightly down from the 58 last year. Nearly 80 percent of the wildfire spots occurred in August and September, many of which were for the Scott Mountain Fire. There were 24 wildfire spot requests in August, and another 17 in September. There were 62 prescribed burn spot requests, 10 more than last year. The bulk of the prescribed burn spots happened in September and October. Optimal fall burning conditions were prevalent in October 2010, due to prolonged dry periods with intermittent bouts of light offshore low-level flow. There were 18 prescribed burn request in October, versus 13 in October 2009. Eugene BLM and the US Fish and Wildlife Service were still conducting prescribed burns in early November. Figures 14 and 17, on pages 49 and 51, show the 2010 spot breakdown by month and the annual spot summary since 1992.

The Willamette National Forest continued to be the primary user. The Willamette NF accounted for about 33 percent of the total spot requests. The Willamette NF had 21 wildfire spot requests in 2010, compared to 44 in 2009. The majority of the wildfire spot requests for the Willamette NF were attributed to the Scott Mountain Fire. The Forest Service accounted for 58 of the 120 total spot requests. Another major player was the US Fish and Wildlife Service. Of the 62 prescribed burn spot requests, 26 came from the Fish and Wildlife Service. Last year the USFWS had six spot requests. Other agencies that were prominent in the spot forecast program included the Washington Department of Natural Resources (DNR), Oregon Department of Forestry (ODF), and the BLM. City agencies, like Portland Fire and Tualatin Valley Fire and Rescue, had a couple of requests. Even county emergency management had a few requests. Surprisingly, the Gifford Pinchot NF had a total of just four spot requests, two for prescribed burns and two for wildfires. As is customary, the Salem BLM office conducted an early-spring spray project that resulted in two spot requests.

The most active spot months, by far, were August and September, with a total of 63 spot requests. July was rather quiet, with 14 spot forecasts. There were a handful of requests for training purposes, such as fire schools, and one other request for a search-and-rescue mission in the Willamette National Forest.

INTERESTING SPOT FORECAST TIDBITS FOR 2010

- The **FIRST** spot request for 2010 occurred May 14th. The Columbia Gorge National Recreation Area made a request for a prescribed burn on the Sandy River delta. The **LAST** spot request for the season was November 2nd, submitted by the Eugene BLM for the Upper Siuslaw prescribed burn.

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- ☛ The **FIRST** wildfire spot was issued July 14th, requested by the Forest Grove Fire Dept. for a fire in their jurisdiction. The **LAST** wildfire spot forecast was issued September 15th, by the McKenzie Ranger District of the Willamette NF for the Scott Mountain Fire.
- ☛ The most spot forecasts in one day: 6 on September 14th. There were three days with 4 spots.
- ☛ There were 58 spot requests from the Forest Service (USFS), or 48 percent of the seasonal total. The BLM made five requests, compared to nine last year. Three of the five requests were for prescribed burns, and the other two were for an early spring spray project. Oregon Department of Forestry submitted five requests, three for prescribed burns and two for wildfires. The US Fish and Wildlife Service had 26 spot requests. Two requests came from the City of Portland, and five others from county emergency management officials.
- ☛ The 58 USFS spot requests were divided amongst the forests as follows: 38 for the Willamette, 16 for the Mt. Hood, 4 for the Gifford Pinchot, and zero for the Siuslaw.
- ☛ The Eugene BLM district had five spots, while the Salem district did not have any spot requests.
- ☛ August was much busier compared to last August. There were 26 spot requests this August, compared to 11 last year. There were 37 spot requests in September, just about equal to September 2009. There were two large fires (100 acres or at least Type II management level) in the Portland forecast area. The Scott Mountain Fire, in the McKenzie district of the Willamette NF, and the View Lake Complex, in portions of the Mt. Hood and Willamette NF. Another fire of note was the Hilltop Fire that burned in Washington DNR land near Larch Mountain.

TURN-AROUND TIME

“Turn-Around Time” has been documented since the 2000 season. It is defined as the elapsed time between spot request receipt, or notification, and forecast transmission. The Web-based spot program makes this element very easy to monitor. However, some complications continue for prescribed burns. Quite often, the user-agency will submit a spot request the day before actual ignition. Obviously, turn-around time is not applicable in these cases. The precedent for the Portland office is to disregard turn-around time for requests submitted in advance of the actual burn time.

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A past agreement between the former Pacific Northwest Wildfire Coordinating Group (PNWCG) and Western Region of the National Weather Service (NWS) stated that required turn-around times were to be no more than 45 minutes for wildfire spot requests and 60 minutes for prescribed burns, unless prior arrangements have been made. In 2010 the Portland office achieved a turn-around time of 34.79 minutes for prescribed burns, and other miscellaneous requests, when turn-around time was applicable, and 38.55 minutes for wildfires. The average non-wildfire spot forecast turn-around time for 2010 was about six minutes longer than the average for 2009. The 2010 wildfire spot forecast turn-around time was also about six minutes longer than last year. There are rare occasions that the Portland office may not have a qualified spot forecaster on duty when a spot request is received. When this occurs, a certified spot forecaster must be called back to the office. At the end of the 2010 season the Portland office had nine qualified spot forecasters and two others in training status. The likelihood of having to call in someone to handle a spot request is much lower than previous years.

The web-based spot program provides a quick and easy means for users to request spot forecasts. There were a few occasions when the completed spot forecast suffered delays upon transmission. There has been infrequent software glitches that result in delayed spot request receipt by the forecast office, or delayed spot forecast transmission to the user.

There were two instances when the applicable turn-around time exceeded 100 minutes. The first occurred August 24th when a wildfire spot request was submitted for the Scott Mountain Fire. The spot request was sent at 1926 PDT. There was not a spot-qualified forecaster on duty at the time, which required a call-back to the fire weather forecaster that was on shift earlier in the day. The other occasion took place September 7th. A spot request was sent at 1415 PDT for the Scott Mountain Fire. The forecaster on duty had to first finish the afternoon fire weather forecast and the NFDRS forecast. Normally, a wildfire spot forecast takes precedence over all other duties. In this case, per agreement with the user, the forecast was delayed. The fire was in mop-up and monitor status with minimal personnel, and the region was under a cool and moist weather regime. Turn-around times for the two spots were 123 and 131 minutes, respectively. The Annual Operating Plan (AOP) states that prescribed burn requests **SHOULD** be received by 1200 on any given day. Typical spot turn-around times were on the order of 20 to 30 minutes.



Figure 13 – Portable Fire RAWS

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FIGURE 14 – 2010 SPOT FORECASTS (BY MONTH)

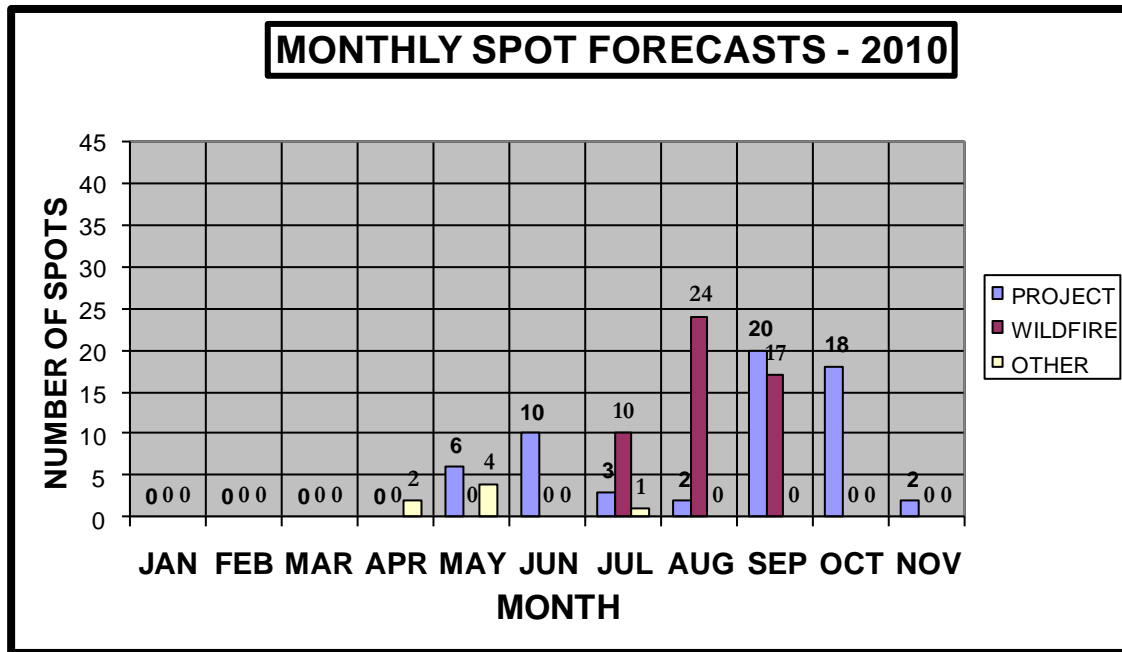


Table 8 (next page) shows the annual spot forecast data from 1994 to 2010. The spot frequency showed a dramatic increase from 2000 to 2003, but due to the change in forecast area responsibility and agency requirements for prescribed burns, 2004 spot totals were much lower. Also, some units/districts curtailed prescribed burn activities starting in 2004 due to budget constraints, staffing concerns, or a number of other reasons.

Seasonal spot totals have been rather consistent since 2008, averaging around 125 spots per season. The abnormally wet May and June this year severely curtailed prescribed burn projects, but some agencies took advantage of the dry October to do pile-burning. Wildfire spot requests have dwindled during the past couple of years. There were 73 wildfire spot requests in 2008, followed by 58 in 2009, and 51 for 2010.



Figure 15 – Scott Mtn. Fire

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TABLE 8 – ANNUAL SPOT FORECAST DATA

YEAR	PROJECT*	WILDFIRE	TOTAL
1994	44	21	65
1995	104	15	119
1996	64	51	115
1997	58	9	67
1998	52	31	83
1999	58	54	112
2000	89	20	109
2001	125	70	195
2002	123	147	270
2003	117	132	249
2004	71	21	92
2005	55	29	84
2006	120	96	216
2007	70	25	95
2008	61	73	134
2009	57	58	115
2010	69	51	120

* = INCLUDES TRAINING SPOTS, SEARCH AND RESCUE, AND OTHER MISC. REQUESTS.

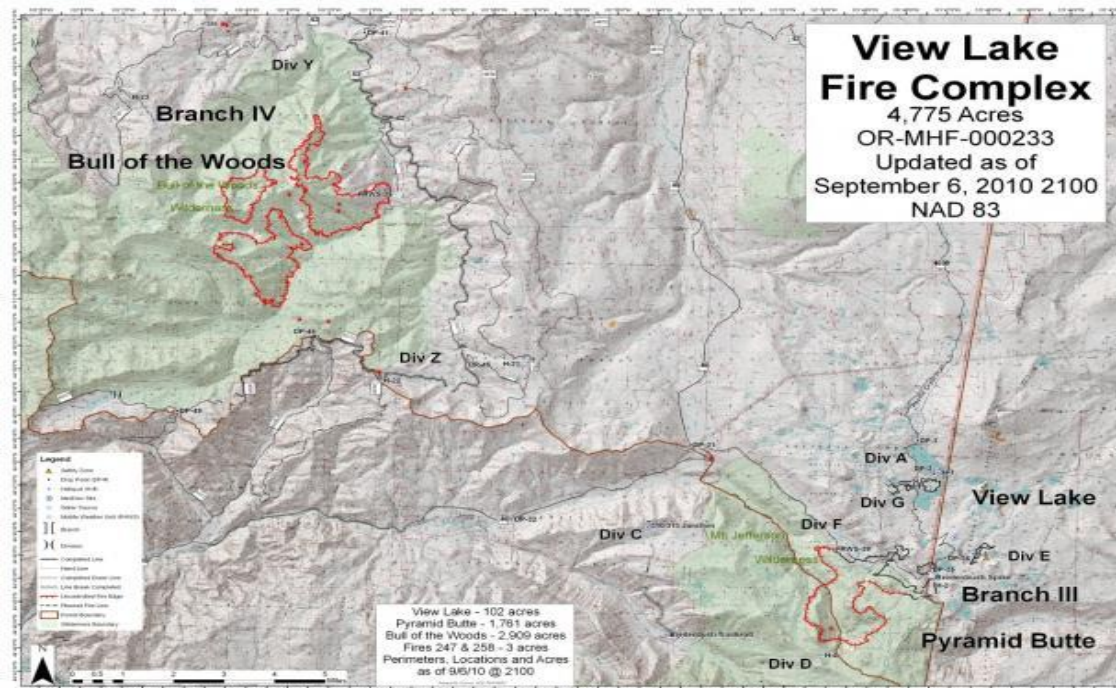
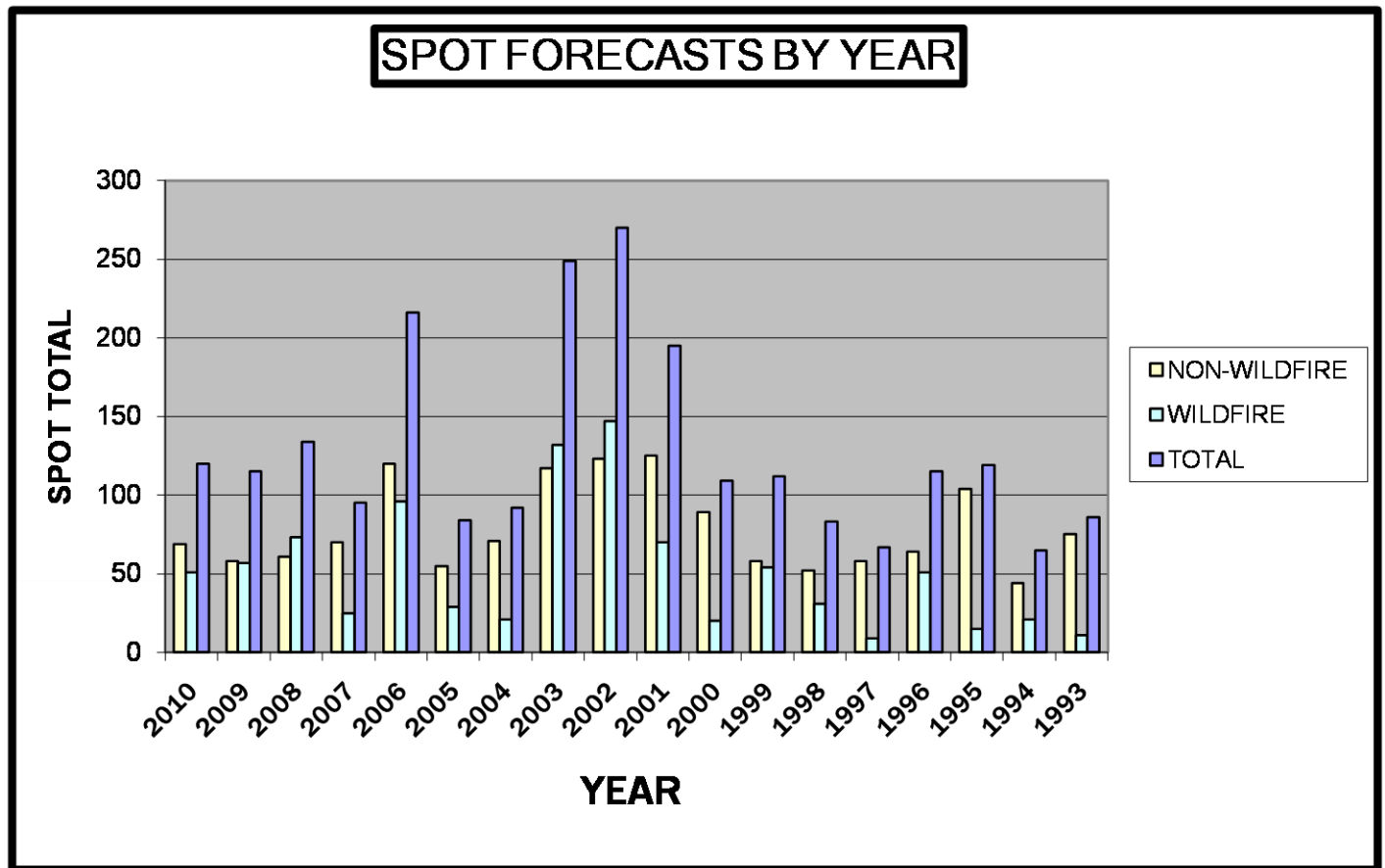


Figure 16 – View Lake Complex Briefing Map

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Figure 17 below shows the yearly spot breakdown from 1993 to 2010

FIGURE 17 – ANNUAL SPOT FORECAST TOTALS



FORECAST SERVICES

The fire weather desk was staffed from March 15th, 2010 through October 29th, 2010. Full-time fire weather operations (7 days a week) commenced on May 30th, 2010, a few days later than last year, and ended on October 9th, 2010, about the same time as last year. Internet weather briefings started on June 18th, 2010. Internet briefing participation continued to increase this year. There were generally 6-10 users on during peak fire season, and up to around 15 during critical event periods. Eugene Dispatch, Mt. Hood N.F., Gifford Pinchot N.F., several ODF units, and the north and south zones of Willamette N.F. were primary participants. Daily internet briefings ended on September 19th, and then went to a Monday-Wednesday-Friday schedule September 20th through October 8th. The Portland office participated in daily coordination calls set up by the Northwest Coordination Center. These calls started on July 5th and ended September 8th. The Portland office also supplied one person to the Coordination Center from March through the end of October. The office continued to have two IMETs.

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NFDRS forecasts started on April 8th and ended on October 29th. This was the second year of doing an all-points forecast. Verification statistics are based on persistence forecasts.

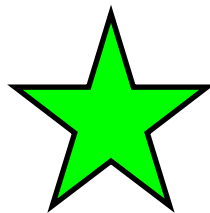
The baseline statistic is forecaster improvement over persistence. The old Memorandum of Understanding (MOU), which expired in 2005, included verification performance standards. These standards included 35 percent improvement for temperature, 25 percent improvement for humidity, and 10 percent improvement for wind. The current expectations are less rigid than the expired MOU. The Portland office experienced about a two percent decrease in temperature performance, 38 percent improvement over persistence this year compared to 40 percent in 2009. The 2010 humidity score was six percent lower, 28 percent this year to 34 percent in 2009. The Portland office achieved its highest wind score since at least 2000, exceeding last year's record-setting mark, posting a 5.5 percent improvement over persistence.

August and September were exceptional months for NFDRS forecasting. The temperature scores were close to 40 percent, the humidity scores around 30 percent, but the wind scores were 13.3 percent and 15.0 percent, respectively. There were 3065 individual NFDRS forecasts in 2010, which was slightly lower than the 2009 total of 3174.

TRAINING AND EDUCATIONAL OUTREACH ACTIVITIES

Portland continued to be heavily involved in teaching and training activities. Table 9 shows all of the outreach activities from fall 2009 through fall of 2010. The Portland office has several people involved in training and outreach activities. The S-190 through S-590 series has undergone major revisions in the past few years. PowerPoint presentations have been developed, replacing the slides and overhead projection graphics. Portland continues to have some responsibility for teaching and training services for zones 609, 610, and 611, although Pendleton is the primary resource.

The Portland office is unique in that a National Weather Service fire weather meteorologist is detailed at the Northwest Coordination Center from March through October. This creates an improving working relationship between Predictive Services and the National Weather Service. It also provides many additional outreach opportunities.



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TABLE 9 – TRAINING AND EDUCATIONAL OUTREACH ACTIVITIES

DATES	ACTIVITY	AGENCY/USER	INSTRUCTOR
September 15-16, 2009	S-290 BEND, OR	USFS	RUTHFORD
November 7-8, 2009	S-290 SPRINGFIELD, OR	S. WILL. VALLEY	WEISHAAR
November 12-13, 2009	NWS/NWCC FALL MEETING	NWS & NWCC	RUTHFORD
November 14-15, 2009	S-290 TUALATIN, OR	TVFR	ROCKEY
January 9-10, 2010	S-290	CLACK. COMMUNITY COLLEGE	WEISHAAR
January 11-12, 2010	S-390 REDMOND	CENTRAL OREGON COMMUNITY COLLEGE	RUTHFORD/WEISHAAR
January 19-22, 2010	FIRE BEHAVIOR WORKSHOP	NWCC	RUTHFORD
January 25, 2010	AG SHOW		RUTHFORD
February 24, 2010	OFFICE TOUR	PORTLAND FIRE ACADEMY	WEISHAAR
March 5-6, 2010	PAC NW WORKSHOP, SEATTLE		RUTHFORD
March 10, 2010	DISPATCHER WORKSHOP PRESENTATION		RUTHFORD
March 12-13, 2010	S-290	TVFR	WEISHAAR
March 22-26, 2010	IMET WORKSHOP	NWS	WEISHAAR/RUTHFORD
April 5-9, 2010	S-490 AND S-290	CENTRAL ORE. COMMUNITY COLLEGE	RUTHFORD
April 14-15, 2010	PRESENTATION, MEDFORD	SO. ORE/N. CAL USERS MEETING	RUTHFORD
April 22, 2010	PRESENTATION, K. FALLS	SPRING OPS MEETING	RUTHFORD/WEISHAAR

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DATES	ACTIVITY	AGENCY/USER	INSTRUCTOR
April 23, 2010	WFO FIRE WX MEETING		WEISHAAR
April 27-29, 2010	WFDSS WORKSHOP, PORTLAND		RUTHFORD
April 28-29, 2010	S-390, SPRINGFIELD	ODF	WEISHAAR/WEAGLE
May 1-2, 2010	S-290 CCC	CLACK. COMM. COLLEGE	COLLINS
May 4, 2010	MT. HOOD FMO MEETING	USFS	WEISHAAR
May 4, 2010	ORE. IMT MEEING, HOOD RIVER	VARIOUS	RUTHFORD
May 5, 2010	ATTEND NWS SEATTLE USERS MEETING	VARIOUS	RUTHFORD
May 11, 2010	S-190	MT. HOOD NF	WEISHAAR
May 12, 2010	PRESENTATION	BURNS BLM	RUTHFORD
May 13, 2010	PRESENTATION	PRINEVILLE, BLM	RUTHFORD
May 17, 2010	TOUR	PORTLAND FIRE ACADEMY	WEISHAAR
May 19, 2010	ATTEND FIRE REFRESHER, AMBOY		RUTHFORD
June 7, 2010	MT. HOOD/GIFF. PINCHOT FMO MEETING	USFS	RUTHFORD
June 14-16, 2010	PREPAREDNESS REVIEW	COL. GORGE SCENIC AREA	RUTHFORD
June 15, 2010	S-190, CAMP BALDWIN	USFS	COLLINS
August 3, 2010	LIVE INTERVIEW	LOCAL TV	RUTHFORD
October 25-29, 2010	FIRE BEHAVIOR & FUELS CONFERENCE	NWS/NWCC	RUTHFORD/WEISHAAR
November 1-2, 2010	S-290 REDMOND	CENTRAL ORE. COMM. COLLEGE	RUTHFORD

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LARGE FIRES AND IMET DISPATCHES

The 2010 fire season was rather inactive, similar to the 2009 season, in terms of large fires. There were two large fires in the Portland Forecast area, shown below in Table 10.

TABLE 10 – MAJOR FIRES

FIRE NAME	AGENCY	SIZE	START DATE	CONTAIN DATE	CAUSE
View Lake Complex	USFS Mt. Hood and Willamette	4,775	August 17, 2010	October 15, 2010	Lightning
Scott Mountain Fire	USFS Willamette	3,464	August 19, 2010	October 31, 2010	Lightning

The Portland office fulfilled several spot forecasts for the Hilltop Fire, in Washington Department of Natural Resources land near Larch Mountain. This 80-acre fire did not reach Type I or Type II Incident Management status. The Portland office continued to have two qualified IMET's in 2010. One of the IMETs spent considerable amount of time detailed at the Northwest Coordination Center to provide support for decision-making and resource allocation. This continues to be a very important mission to the Coordination Center.

The Portland office filled **FIVE** IMET requests. One dispatch was for a search-and-rescue mission on Mt. Hood, and two others were to support the Deepwater Horizon oil well disaster.

1. MT. HOOD SEARCH AND RESCUE (1.5 DAYS)

IMET: SCOTT WEISHAAR
DATES: December 13th and 14th, 2009
LOCATION: Timberline Lodge.

2. DEEPWATER HORIZON ICC AND NWS SUPPORT (16 DAYS)

IMET: JULIA RUTHFORD
DATES: May 22nd through June 6th
LOCATION: Houma, LA ICC and Slidell, LA WFO
CAUSE: Oil Well disaster

3. DEEPWATER HORIZON VENICE STAGING (16 DAYS)

IMET: SCOTT WEISHAAR
DATES: June 26th through July 11th
LOCATION: Venice Staging in Venice, LA

ICP – Venice Coast Guard Facility

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IMT: Unified Command between Coast Guard and BP Oil
CAUSE: Oil Well disaster

4. VIEW LAKE COMPLEX (15 DAYS)

IMET: JULIA RUTHFORD
DATES: August 25th through September 8th
LOCATION: Olallie Lake Scenic Area, Mt. Jefferson Wilderness, Bull of the Woods Wilderness

ICP: Ripplebrook Ranger Station
IMT: Pacific Northwest Type I Team 2, Portland NIMO
IC – Hoff and Cable
CAUSE: Lightning

5. SCOTT MOUNTAIN FIRE (7 DAYS)

IMET: SCOTT WEISHAAR
DATES: August 26th through September 2nd
LOCATION: Near McKenzie Pass in the Willamette NF

ICP: Oak Flat Staging near McKenzie Bridge
IMT: Pacific Northwest Type I Team 1
IC – Pendleton
CAUSE: Lightning

FINAL SUMMARY

The 2010 fire season was fairly quiet. The most significant period was mid-July through August. A very wet spring delayed the onset of typical fire season conditions by at least 3 to 4 weeks. Extreme fuel conditions developed in 2010, but did not persist for an extended period of time. Critical ERC values were realized for about 2-3 weeks in August. The most extreme period was August 10th through August 30th. There were two Red Flag events, which was a little below average for any given year. Lightning activity was less frequent, especially for the coast, coast range, and the North Oregon and South Washington Cascades and foothills. Antecedent conditions, including snow pack and spring precipitation, among other things, resulted in a later-than-normal start to the peak fire season. Frequent wetting rain events persisted into mid-June, which helped to maintain very low fuel indices. The wet spring severely curtailed prescribed burn activity. The only major heat wave of the season occurred in mid-August, followed by a lightning event, and then an offshore episode. Dry spells varied from 80 days in the Coast Range zones, to 45 days in the Central Oregon Cascades and foothills. The forecast area had two large fires.

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